



Rec'd PCT/PTO 27 SEP 2002

SEQUENCE LISTING

<10> LOOSMORE, Sheena M.
YANG, Yan-Ping
KLEIN, Michel H.

<120> PROTECTIVE RECOMBINANT HAEMOPHILUS INFLUENZAE HIGH
MOLECULAR WEIGHT PROTEINS

<130> 1038-1138 MIS

<140> 09/806,709

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<151> 1999-10-07

<150> 09/167,568

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<150> 09/206,942

<151> 1999-12-08

<160> 95

<170> PatentIn Ver. 2.1

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<211> 1220

<212> PRT

<213> Haemophilus influenzae

<400> 28

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 Leu Trp Ser Glu Asn Asp Asn Ser Ser Gly Val Asp Ile Lys Gly Asn
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<213> Haemophilus influenzae

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 325 330 335

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 aatgtgacat taaataccac aggcacctta actactgtag cgggttcaaa cattaaggca 2400
 accagtggca ctttagctat taacgcaaaa gatgctaagt tagatggtag tgcacaggt 2460
 gaccgcacag tagtaaatgc aactaacgca agtggctctg gtagtgtgac tgcggcaacc 2520
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<210> 32
 <211> 969
 <212> PRT
 <213> Haemophilus influenzae

<400> 32

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Asn	Glu	Asp	Leu	Glu	Tyr	Thr	Gly	Thr	Gly	Glu	Asn	Ile	Asn	Asn	Pro
			20					25					30		
Lys	Val	Asn	Asn	Gln	Ser	Lys	Lys	Thr	Leu	Thr	Ser	Ser	Ile	Leu	Glu
		35					40					45			
Asn	Ile	Leu	Lys	Lys	Gly	Ser	Phe	Val	Asn	Ile	Thr	Ala	Thr	Asp	Asn
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Ile	Tyr	Val	Asn	Ser	Ser	Ile	Asn	Ile	Gly	Asp	Ser	Gly	His	Leu	Ile
	65				70					75					80
Leu	Ser	Gly	Gly	Gly	Arg	Asn	Gly	Gly	Gly	Val	Lys	Ile	Asn	Lys	Asn
				85					90					95	
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			100					105					110		
Asp	Ile	His	Ser	Asn	Ile	Ser	Leu	Gly	Thr	Gly	Phe	Leu	Asn	Ile	Thr
		115					120					125			
Ser	Asn	Gly	Ser	Val	Ala	Phe	Glu	Lys	Ala	Asp	Lys	Asp	Lys	Ala	Arg
	130					135					140				
Ser	Ala	Ala	Asp	Ala	Gln	Ile	Val	Ala	Gln	Gly	Ile	Ile	Asn	Leu	Thr
	145				150					155				160	
Gly	Glu	Asn	Lys	Thr	Phe	Arg	Leu	Asn	Asn	Val	Ser	Leu	Asn	Gly	Val
				165					170					175	
Gly	Gln	Gly	Leu	Ser	Ile	Thr	Ser	Asn	Val	Gly	Asn	Gln	Thr	His	Lys
			180					185					190		
Phe	Asp	Gly	Glu	Ile	Asn	Ile	Thr	Gly	Asn	Val	Thr	Ile	Asn	Gln	Thr
		195					200					205			
Ala	Pro	Ala	Thr	Thr	Ala	Tyr	Trp	Asn	Phe	Ser	Tyr	Asp	Ser	Tyr	Trp
	210					215					220				
Asn	Val	Ser	Thr	Leu	Asn	Val	Gln	Lys	Asn	Ser	Ser	Phe	Thr	Phe	Ile
	225				230					235					240
Lys	Arg	Thr	Glu	Ser	Asn	Arg	Phe	Gly	Pro	Thr	Thr	Pro	Leu	Arg	Ser
				245					250					255	
Ser	Gly	Gly	Val	Phe	Phe	Asn	Gly	Thr	Asn	Gly	Asn	Met	Val	Leu	Asn
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Val Gly Thr Asn Ser Arg Val Leu Phe Asn Leu Lys Pro Asn Glu Asn
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 Thr Asn Asn Ser Lys Pro Leu Pro Leu Gln Phe Asn Ala Asn Ile Thr
 290 295 300
 Ala Ile Gly Gly Gly Ser Val Ser Phe Asp Ile His Ala Asn His Ser
 305 310 315 320
 Gly Arg Gly Ala Glu Leu Lys Met Asn Thr Ile Asn Ile Ser Asp Gly
 325 330 335
 Thr Ser Leu Thr Leu Gln Ser His Val Arg Lys Asp Ser Ala Phe Ile
 340 345 350
 Ile Ser Lys Asp Leu Thr Ile Asn Ala Thr Gly Ser Asn Phe Thr Leu
 355 360 365
 Glu Gln Ser Pro Asp Ser Phe Thr Asp Lys Tyr Pro Gly Arg Ala Ile
 370 375 380
 Ser Ser Thr Lys Asn Ile Thr Ile Ser Gly Gly Asn Val Ser Leu Gly
 385 390 395 400
 Gly Gln Asn Ser Ser Ser Asp Ile Lys Gly Asn Ile Thr Ile Lys Ser
 405 410 415
 Ser Thr Asn Val Thr Leu Lys Ala His Asn Ser Pro Arg Asp Phe Ala
 420 425 430
 Ser Arg Thr Leu Thr Leu Gly Asn Leu Asn Val Glu Gly Asn Leu Thr
 435 440 445
 Leu Thr Gly Ser Val Ala Asp Ile Lys Gly Asn Leu Ser Ile Leu Asn
 450 455 460
 Asp Ala Thr Phe Lys Gly Glu Thr Ser Glu Asn Leu Asn Ile Thr Gly
 465 470 475 480
 Asn Phe Thr Asn Asn Gly Thr Ala Asp Ile Asn Ile Lys Gln Gly Val
 485 490 495
 Val Asn Ile Gln Gly Asn Ile Thr Asn Lys Gly Gly Leu Asn Ile Thr
 500 505 510
 Thr Asn Ala Gln Asn Asn Gln Lys Thr Ile Ile Asn Gly Asn Ile Thr
 515 520 525
 Asn Glu Gly Gly Asp Leu Asn Ile Lys Asp Ser Asn Asn Asn Ala Glu
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 Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys Lys Gly Asn Leu Thr Ile
 545 550 555 560
 Ser Ser Asp Lys Ile Asn Ile Thr Lys Lys Ile Thr Ile Lys Ala Gly
 565 570 575
 Val Asp Glu Gly Gly Ser Asp Ser Ser Pro Ala Ser Asn Ala Asn Leu
 580 585 590

Thr Ile Lys Thr Lys Thr Leu Glu Leu Thr Gly Asp Leu Asn Ile Ser
 595 600 605
 Gly Phe Asn Lys Ala Glu Ile Thr Ala Lys Asn Gly Asn Asp Leu Thr
 610 615 620
 Ile Gly Lys Ala Ser Asp Gly Asn Ala Asn Ala Lys Lys Val Thr Phe
 625 630 635 640
 Asp Lys Val Lys Asp Ser Lys Ile Ser Ala Asn Gly His Asn Val Thr
 645 650 655
 Leu Asn Ser Lys Val Glu Thr Ser Asn Ser Asp Ser Ser Ala Asp Asp
 660 665 670
 Ser Asn Asp Asn Asn Thr Gly Leu Thr Ile Ser Ala Lys Asp Val Thr
 675 680 685
 Val Asn Asn Asp Val Thr Ser His Lys Thr Ile Asn Ile Ser Ala Thr
 690 695 700
 Thr Gly Asn Val Thr Thr Lys Glu Ser Thr Thr Ile Asn Ala Ala Thr
 705 710 715 720
 Gly Ser Val Glu Val Thr Ala Lys Thr Gly Asp Ile Ser Gly Thr Ile
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 Ser Gly Asn Thr Val Asn Val Thr Ala Thr Asp Ser Leu Thr Thr Gln
 740 745 750
 Ala Ser Ser Ser Ile Thr Ser Ser Asn Gly Gln Thr Thr Leu Thr Ala
 755 760 765
 Lys Asn Gly Ser Ile Ala Gly Ser Ile Asp Ala Ala Asn Val Thr Leu
 770 775 780
 Asn Thr Thr Gly Thr Leu Thr Thr Val Ala Gly Ser Asn Ile Lys Ala
 785 790 795 800
 Thr Ser Gly Thr Leu Ala Ile Asn Ala Lys Asp Ala Lys Leu Asp Gly
 805 810 815
 Thr Ala Ser Gly Asp Arg Thr Val Val Asn Ala Thr Asn Ala Ser Gly
 820 825 830
 Ser Gly Ser Val Thr Ala Ala Thr Ser Ser Asn Val Asn Ile Thr Gly
 835 840 845
 Asp Leu Ser Thr Ile Asn Gly Leu Asn Ile Ile Ser Lys Asn Gly Lys
 850 855 860
 Asn Thr Val Val Leu Lys Gly Ala Glu Ile Asp Val Lys Tyr Ile Gln
 865 870 875 880
 Pro Gly Val Ala Ser Ala Asn Glu Val Ile Glu Ala Lys Arg Ala Leu
 885 890 895
 Glu Lys Val Lys Asp Leu Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys

900 905 910
 Leu Gly Val Ser Ala Val Arg Phe Val Glu Pro Asn Asn Thr Ile Thr
 915 920 925
 Val Asn Thr Gln Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln Val Thr
 930 935 940
 Ile Ser Glu Asp Lys Ala Cys Phe Ser Ser Gly Asn Gly Ala Ala Val
 945 950 955 960
 Cys Thr Asn Val Thr Asp Asp Arg Gln
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<210> 33
 <211> 3686
 <212> DNA
 <213> Haemophilus influenzae

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 ccatccctaa gtacactaac aaacacacaa cttgagagaa tattaaaaag aaacacctct 180
 gttaatatca ctgccaccaa aacaatcaca gttaatagt ataatcaatat tggagacagc 240
 tcccacttaa ccctttggag tgaggggtcag gggagaggcg gcgttaatgt tacaggcaat 300
 attacttcta ctaccaacgg aaacttaacc atttactctg gcggatgggt tgatgttcat 360
 aaaaacatta cacttaaadc agggacttta aacattacaa ctaaacaagg agacatcgcc 420
 ttcgaagaca aaccagggtc gagcaaccta accattacag ctaaaggagc cattgccgtg 480
 aacaacaaga aaggcttttag gtttgataat gtcactctaa atggaacggg aggagggtc 540
 tcttttaaat acatcgaaac cggaaataga gatagcaatt tcgaaaccca ttttagagga 600
 agattaaata tttcaggga agtagatata ttaagtcaag caaggcagga gaactggaac 660
 cgcagacact ggggacgctc ccactggaat gtaaccgat tgaacgtttc tgaaaacagt 720
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 aatgcccaat cgggttttaa tggcatatcg ttaataatg acactgtttt taatattgca 840
 gcaagtccg cgggttaact taacatcaaa ccaccaatag tagacaaagt aaccaacggg 900
 aatcacacat tattcaaagg gaatatattca gttttagggg gggggatgtc aactttcatt 960
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 gaggagctat ttttaaagat atcgagaata ctggcagctc gaatattacc actaaatccg 1560
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ccacagaagg ctcaactatt aacgcgacaa cagggtgatgc aaatattaca acccaaacag 2580
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<210> 34

<211> 1228

<212> PRT

<213> Haemophilus influenzae

<400> 34

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Leu Gly Arg Thr Glu Ser Thr Pro Asn Asn Asn Glu Tyr Asp Ser Pro
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Asn Gln Ile Asn Tyr Lys Asn Lys Pro Ser Leu Ser Thr Leu Thr Asn
35 40 45

Thr Thr Leu Glu Arg Ile Leu Lys Arg Asn Thr Ser Val Asn Ile Thr
50 55 60

Ala Thr Lys Thr Ile Thr Val Asn Ser Asp Ile Asn Ile Gly Asp Ser
65 70 75 80

Ser His Leu Thr Leu Trp Ser Glu Gly Gln Gly Arg Gly Gly Val Asn
85 90 95

Val Thr Gly Asn Ile Thr Ser Thr Thr Asn Gly Asn Leu Thr Ile Tyr
100 105 110

Ser Gly Gly Trp Val Asp Val His Lys Asn Ile Thr Leu Lys Ser Gly
115 120 125

Tyr Leu Asn Ile Thr Thr Lys Gln Gly Asp Ile Ala Phe Glu Asp Lys
130 135 140

Pro Gly Leu Ser Asn Leu Thr Ile Thr Ala Lys Gly Thr Ile Ala Val
 145 150 155 160
 Asn Asn Lys Lys Gly Phe Arg Phe Asp Asn Val Thr Leu Asn Gly Thr
 165 170 175
 Gly Gly Gly Leu Ser Phe Lys Tyr Ile Glu Thr Gly Asn Arg Asp Ser
 180 185 190
 Asn Phe Glu Thr His Phe Arg Gly Arg Leu Asn Ile Ser Gly Lys Val
 195 200 205
 Asp Ile Leu Met Gln Ala Arg Gln Glu Asn Trp Asn Arg Arg His Trp
 210 215 220
 Gly Arg Ser His Trp Asn Val Thr Arg Leu Asn Val Ser Glu Asn Ser
 225 230 235 240
 Tyr Phe Asn Val Thr Ile Asp Ser Ser Gly Ser Ala Ser Ser Pro Gly
 245 250 255
 Ala Gly Pro Leu Asn Ala Gln Ser Gly Leu Asn Gly Ile Ser Phe Asn
 260 265 270
 Asn Asp Thr Val Phe Asn Ile Ala Ala Ser Ser Ala Val Asn Phe Asn
 275 280 285
 Ile Lys Pro Pro Ile Val Asp Lys Val Thr Asn Gly Asn His Thr Leu
 290 295 300
 Phe Lys Gly Asn Ile Ser Val Leu Gly Gly Gly Met Ser Thr Phe Ile
 305 310 315 320
 Phe Asn Ala Ser Ser Ser Asn Tyr Gln Thr Tyr Gly Val Ile Ile Glu
 325 330 335
 Ser Gln Asn Phe Ser Ala Ser Gly Gly Ser Ser Leu Lys Phe Lys Ser
 340 345 350
 Glu Gly Ser Thr His Ala Ala Phe Thr Ile Lys Asn Asp Leu Ile Leu
 355 360 365
 Asn Ala Thr Gly Gly Asn Ile Ser Leu Asn Gln Val Ala Gly Ile Asp
 370 375 380
 Ser Asn Leu Lys Lys Ser Leu Ile Ala Asn Lys Asn Ile Thr Phe Glu
 385 390 395 400
 Gly Gly Asn Ile Thr Leu Ala Ala Asp Lys Lys Pro Ile Glu Ile Lys
 405 410 415
 Gly Asn Ile Thr Val Lys Glu Gly Ala Asn Val Thr Leu Arg Ser Ala
 420 425 430
 Asn Tyr Gly Asn Asp Lys Ser Ala Leu Ser Ile Arg Gly Asn Val Thr
 435 440 445
 Asn Lys Gly Asn Leu Thr Val Thr Gly Ser Ala Ile Asn Ile Glu Lys
 450 455 460

Asn Leu Thr Val Glu Gly Ser Ala Lys Phe Leu Ala Asn Pro Asn Tyr
 465 470 475 480
 Ser Phe Asn Val Ser Gly Leu Phe Asp Asn Gln Gly Lys Ser Asn Ile
 485 490 495
 Ser Ile Ala Lys Gly Gly Ala Ile Phe Lys Asp Ile Glu Asn Thr Gly
 500 505 510
 Ser Leu Asn Ile Thr Thr Lys Ser Asp Ser Asn His His Thr Ile Ile
 515 520 525
 Lys Gly Asn Ile Thr Asn Arg Lys Gly Asp Leu Asn Ile Thr Asn Asn
 530 535 540
 Gly Asp Asn Thr Glu Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys Glu
 545 550 555 560
 Gly Asn Leu Thr Ile Ser Ser Asp Lys Val Asn Ile Thr Glu Arg Ile
 565 570 575
 Thr Ile Lys Ala Gly Val Asn Gly Asp Asn Ser Asp Ser Asn Glu Ala
 580 585 590
 Thr Ser Ala Asn Leu Thr Ile Lys Thr Lys Glu Leu Lys Leu Thr Asn
 595 600 605
 Asp Leu Asn Ile Ser Gly Phe Asn Lys Ala Glu Ile Thr Ala Lys Asp
 610 615 620
 Asn Ser Asn Leu Thr Ile Gly Asp Asn Ser Asp Ala Gly Asn Thr Asp
 625 630 635 640
 Ala Lys Lys Val Thr Phe Ser Asn Val Lys Asp Ser Lys Ile Ser Ala
 645 650 655
 Ser Asp His Asn Val Thr Leu Asn Ser Lys Val Glu Thr Ser Gly Asp
 660 665 670
 Thr Asp Ser Thr Glu Asp Gly Gly Asn Asn Asn Thr Gly Leu Thr Ile
 675 680 685
 Thr Ala Lys Asn Val Thr Val Asn Asn Asn Ile Thr Ser His Lys Thr
 690 695 700
 Val Asn Ile Thr Ala Ser Glu Asn Val Thr Thr Lys Ala Gly Thr Thr
 705 710 715 720
 Ile Asn Ala Thr Thr Gly Ser Val Glu Val Thr Ala Lys Thr Gly Asp
 725 730 735
 Ile Lys Gly Gly Ile Glu Ser Asn Ser Gly Asn Val Asn Ile Thr Ala
 740 745 750
 Ser Gly Asp Thr Leu Asn Val Ser Asn Ile Thr Gly Gln Asn Val Thr
 755 760 765
 Val Ala Ala Ala Ser Gly Ala Val Thr Thr Thr Lys Gly Ser Thr Ile

770	775	780
Asn Ala Thr Thr Gly 785	Asn Ala Asn Ile Thr 790	Thr Thr Lys Thr Gly Glu Ile 795 800
Asn Gly Glu Val Lys 805	Ser Ala Ser Gly Asn 810	Val Asn Ile Thr Ala Ser 815
Gly Asn Thr Leu Asn Val Ser 820	Asn Ile Thr Gly Gln Asn Val Thr Val 825 830	
Thr Ala Asn Ser Gly Ala Ile Thr Thr Thr Glu Gly Ser Thr Ile Asn 835 840 845		
Ala Thr Thr Gly Asp Ala Asn Ile Thr Thr Gln Thr Gly Asn Ile Asn 850 855 860		
Gly Lys Val Glu Ser Ser Ser Gly Ser Val Thr Leu Ile Ala Thr Gly 865 870 875 880		
Gln Thr Leu Ala Val Gly Asn Ile Ser Gly Asp Thr Val Thr Ile Thr 885 890 895		
Ala Asp Lys Gly Lys Leu Thr Thr Gln Thr Ser Ser Lys Ile Asn Gly 900 905 910		
Thr Lys Ser Val Thr Thr Ser Ser Gln Ser Gly Asp Ile Ser Gly Thr 915 920 925		
Ile Ser Gly Asn Thr Val Ser Val Ser Ala Thr Gly Ser Leu Thr Thr 930 935 940		
Gln Ala Gly Ser Lys Ile Glu Ala Lys Thr Gly Glu Ala Asn Val Thr 945 950 955 960		
Ser Ala Thr Gly Thr Ile Gly Gly Thr Ile Ser Gly Asn Thr Val Asn 965 970 975		
Val Thr Ala Asn Thr Asp Asn Leu Thr Ile Lys Asp Gly Ala Arg Ile 980 985 990		
Lys Ala Thr Gly Gly Ala Val Thr Leu Thr Ala Thr Gly Gly Thr Leu 995 1000 1005		
Thr Thr Glu Thr Ser Ser Asp Ile Thr Ser Ser Asn Gly Gln Thr Thr 1010 1015 1020		
Leu Thr Ala Lys Asp Ser Ser Ile Ala Gly Ser Ile Asn Ala Ala Asn 1025 1030 1035 1040		
Val Thr Leu Asn Thr Thr Gly Thr Leu Thr Thr Val Ala Gly Ser Lys 1045 1050 1055		
Ile Glu Ala Ala Ser Gly Thr Leu Val Ile Asn Ala Lys Asp Ala Gln 1060 1065 1070		
Leu Asp Gly Ala Ala Ser Gly Asp His Thr Val Val Asn Ala Thr Asn 1075 1080 1085		

Ala Asn Gly Ser Gly Ser Val Ile Ala Thr Thr Ser Ser Arg Val Asn
1090 1095 1100

Ile Thr Gly Asp Leu Ile Thr Ile Asn Gly Leu Asn Ile Ile Ser Lys
1105 1110 1115 1120

Asn Gly Lys Asn Thr Val Leu Leu Lys Gly Val Glu Ile Asp Val Lys
1125 1130 1135

Tyr Ile Gln Pro Gly Ile Ala Ser Val Asn Glu Val Ile Glu Ala Lys
1140 1145 1150

Arg Ala Leu Glu Lys Val Lys Asp Leu Ser Asp Glu Glu Arg Glu Thr
1155 1160 1165

Leu Ala Lys Leu Gly Val Ser Ala Val Arg Phe Ala Glu Pro Asn Asn
1170 1175 1180

Ala Ile Thr Ile Asn Thr Gln Asn Glu Phe Thr Thr Arg Pro Leu Ser
1185 1190 1195 1200

Gln Val Thr Ile Ser Glu Gly Lys Val Cys Phe Leu Ile Gly Asn Gly
1205 1210 1215

Ala Thr Ile Cys Thr Asn Ile Ala Asp Ile Glu Arg
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<210> 35

<211> 915

<212> PRT

<213> Haemophilus influenzae

<400> 35

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Thr Tyr Gly Val Ile Ile Glu Ser Gln Asn Phe Ser Ala Ser Gly Gly
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Ser Ser Leu Lys Phe Lys Ser Glu Gly Ser Thr His Ala Ala Phe Thr
35 40 45

Ile Lys Asn Asp Leu Ile Leu Asn Ala Thr Gly Gly Asn Ile Ser Leu
50 55 60

Asn Gln Val Ala Gly Ile Asp Ser Asn Leu Lys Lys Ser Leu Ile Ala
65 70 75 80

Asn Lys Asn Ile Thr Phe Glu Gly Gly Asn Ile Thr Leu Ala Ala Asp
85 90 95

Lys Lys Pro Ile Glu Ile Lys Gly Asn Ile Thr Val Lys Glu Gly Ala
100 105 110

Asn Val Thr Leu Arg Ser Ala Asn Tyr Gly Asn Asp Lys Ser Ala Leu
115 120 125

Ser Ile Arg Gly Asn Val Thr Asn Lys Gly Asn Leu Thr Val Thr Gly

130	135	140
Ser Ala Ile Asn Ile Glu Lys Asn Leu Thr Val Glu Gly Ser Ala Lys 145 150 155 160		
Phe Leu Ala Asn Pro Asn Tyr Ser Phe Asn Val Ser Gly Leu Phe Asp 165 170 175		
Asn Gln Gly Lys Ser Asn Ile Ser Ile Ala Lys Gly Gly Ala Ile Phe 180 185 190		
Lys Asp Ile Glu Asn Thr Gly Ser Leu Asn Ile Thr Thr Lys Ser Asp 195 200 205		
Ser Asn His His Thr Ile Ile Lys Gly Asn Ile Thr Asn Arg Lys Gly 210 215 220		
Asp Leu Asn Ile Thr Asn Asn Gly Asp Asn Thr Glu Ile Gln Ile Gly 225 230 235 240		
Gly Asn Ile Ser Gln Lys Glu Gly Asn Leu Thr Ile Ser Ser Asp Lys 245 250 255		
Val Asn Ile Thr Glu Arg Ile Thr Ile Lys Ala Gly Val Asn Gly Asp 260 265 270		
Asn Ser Asp Ser Asn Glu Ala Thr Ser Ala Asn Leu Thr Ile Lys Thr 275 280 285		
Lys Glu Leu Lys Leu Thr Asn Asp Leu Asn Ile Ser Gly Phe Asn Lys 290 295 300		
Ala Glu Ile Thr Ala Lys Asp Asn Ser Asn Leu Thr Ile Gly Asp Asn 305 310 315 320		
Ser Asp Ala Gly Asn Thr Asp Ala Lys Lys Val Thr Phe Ser Asn Val 325 330 335		
Lys Asp Ser Lys Ile Ser Ala Ser Asp His Asn Val Thr Leu Asn Ser 340 345 350		
Lys Val Glu Thr Ser Gly Asp Thr Asp Ser Thr Glu Asp Gly Gly Asn 355 360 365		
Asn Asn Thr Gly Leu Thr Ile Thr Ala Lys Asn Val Thr Val Asn Asn 370 375 380		
Asn Ile Thr Ser His Lys Thr Val Asn Ile Thr Ala Ser Glu Asn Val 385 390 395 400		
Thr Thr Lys Ala Gly Thr Thr Ile Asn Ala Thr Thr Gly Ser Val Glu 405 410 415		
Val Thr Ala Lys Thr Gly Asp Ile Lys Gly Gly Ile Glu Ser Asn Ser 420 425 430		
Gly Asn Val Asn Ile Thr Ala Ser Gly Asp Thr Leu Asn Val Ser Asn 435 440 445		

Ile Thr Gly Gln Asn Val Thr Val Ala Ala Ala Ser Gly Ala Val Thr
 450 455 460
 Thr Thr Lys Gly Ser Thr Ile Asn Ala Thr Thr Gly Asn Ala Asn Ile
 465 470 475 480
 Thr Thr Lys Thr Gly Glu Ile Asn Gly Glu Val Lys Ser Ala Ser Gly
 485 490 495
 Asn Val Asn Ile Thr Ala Ser Gly Asn Thr Leu Asn Val Ser Asn Ile
 500 505 510
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785 790 795 800

Gly Leu Asn Ile Ile Ser Lys Asn Gly Lys Asn Thr Val Leu Leu Lys
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Gly Val Glu Ile Asp Val Lys Tyr Ile Gln Pro Gly Ile Ala Ser Val
820 825 830

Asn Glu Val Ile Glu Ala Lys Arg Ala Leu Glu Lys Val Lys Asp Leu
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Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val Ser Ala Val
850 855 860

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<210> 36
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<213> Haemophilus influenzae

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<210> 37

<211> 1222

<212> PRT

<213> Haemophilus influenzae

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Leu Lys Arg Asn Thr Ser Val Asn Ile Thr Ala Thr Lys Thr Ile Thr

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Arg	Phe	Asp	Asn	Val	Thr	Leu	Asn	Gly	Thr	Gly	Gly	Gly	Leu	Ser	Phe
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Asp	Lys	Val	Thr	Asn	Gly	Asn	His	Thr	Leu	Phe	Lys	Gly	Asn	Ile	Ser
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Asn	Tyr	Gln	Thr	Tyr	Gly	Val	Ile	Ile	Glu	Ser	Gln	Asn	Phe	Ser	Ala
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Ser	Gly	Gly	Ser	Ser	Leu	Lys	Phe	Lys	Ser	Glu	Gly	Ser	Thr	His	Ala
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Ala	Phe	Thr	Ile	Lys	Asn	Asp	Leu	Ile	Leu	Asn	Ala	Thr	Gly	Gly	Asn
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 405 410 415
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 420 425 430
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 450 455 460
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 Leu Asn Ser Lys Val Glu Thr Ser Gly Asp Thr Asp Ser Thr Glu Asp
 660 665 670
 Gly Gly Asn Asn Asn Thr Gly Leu Thr Ile Thr Ala Lys Asn Val Thr
 675 680 685

Val Asn Asn Asn Ile Thr Ser His Lys Thr Val Asn Ile Thr Ala Ser
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<210> 38

<211> 3036

<212> DNA

<213> Haemophilus influenzae

<400> 38

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<211> 1011

<212> PRT

<213> Haemophilus influenzae

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 His Thr His Lys Phe Asp Gly Thr Leu Asn Ile Ser Gly Lys Val Val
 180 185 190
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 Asp Ser Tyr Trp Asn Val Thr Thr Leu Thr Leu Gly Asn Asn Ala Gln
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 275 280 285
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 290 295 300
 His Ala Asn Leu Ser Ala Arg Ser Thr Glu Leu Asn Met Ser Leu Ile
 305 310 315 320
 Asn Ile Ser Asn Gly Val Asn Phe Ser Ile Asn Ser His Val Arg Gly
 325 330 335
 Asn Asn Ala Phe Glu Ile Lys Lys Asp Leu Ile Ile Asn Ala Thr Gly
 340 345 350
 Ser Asn Phe Asn Leu Lys Gln Thr Lys Asp Lys Phe Asp Asn Ser Tyr

355					360					365					
Glu	Lys	Asn	Ala	Ile	Phe	Ser	Thr	His	Asn	Leu	Thr	Ile	Leu	Gly	Gly
370						375					380				
Asn	Val	Thr	Leu	Gly	Gly	Glu	Asn	Ser	Ser	Ser	Asn	Ile	Lys	Gly	Asn
385				390					395						400
Ile	Asn	Ile	Asn	Ser	Lys	Ala	Asn	Val	Thr	Leu	Gln	Ala	His	Ala	Gly
			405					410					415		
Thr	Ser	His	Leu	Asp	Lys	Lys	Glu	Arg	Thr	Leu	Thr	Leu	Gly	Asn	Val
			420				425						430		
Ser	Val	Gly	Gly	Asn	Leu	Asn	Ile	Ile	Gly	Ser	Asn	Ala	His	Ile	Asp
	435					440					445				
Gly	Asn	Leu	Ser	Ile	Ala	Glu	Ser	Ala	Lys	Phe	Gln	Gly	Lys	Thr	Asn
450					455					460					
Asn	Asn	Leu	Asn	Ile	Thr	Gly	Thr	Phe	Thr	Asn	Asn	Gly	Thr	Ala	Asp
465				470					475						480
Ile	Asn	Ile	Lys	Gln	Gly	Val	Val	Lys	Leu	Gln	Gly	Asp	Ile	Thr	Asn
			485					490					495		
Asn	Gly	Asn	Leu	Asn	Ile	Thr	Thr	Asn	Ala	Ser	Val	Asn	Gln	Lys	Thr
		500					505					510			
Ile	Ile	Asn	Gly	Asn	Ile	Thr	Asn	Lys	Lys	Gly	Asp	Leu	Asn	Ile	Lys
	515					520					525				
Asp	Ile	Lys	Ala	Asn	Ala	Glu	Ile	Gln	Ile	Gly	Gly	Asn	Ile	Ser	Gln
530					535					540					
Lys	Glu	Gly	Asn	Leu	Thr	Ile	Ser	Ser	Asp	Lys	Ile	Asn	Ile	Thr	Lys
545				550					555					560	
Arg	Ile	Glu	Ile	Lys	Ala	Asp	Thr	Asp	Gln	Gly	Asn	Ser	Asp	Ser	Gly
			565					570					575		
Val	Ala	Ser	Asn	Ala	Asn	Leu	Thr	Ile	Lys	Thr	Lys	Glu	Leu	Thr	Leu
			580				585					590			
Thr	Asp	Asn	Leu	Asn	Ile	Ser	Gly	Phe	Asn	Lys	Ala	Glu	Ile	Thr	Ala
	595					600					605				
Lys	Asp	Asn	Ser	Asp	Leu	Ile	Ile	Gly	Lys	Ala	Ser	Ser	Asp	Asn	Ser
610					615					620					
Asn	Ala	Lys	Gln	Ile	Thr	Phe	Asp	Lys	Val	Lys	Asp	Ser	Lys	Ile	Ser
625				630					635					640	
Ala	Gly	Asn	His	Asn	Val	Thr	Leu	Asn	Ser	Lys	Val	Glu	Thr	Ser	Asn
			645					650					655		
Ser	Asp	Gly	Ser	Thr	Gly	Asn	Gly	Ser	Asp	Asp	Asn	Asn	Ile	Gly	Leu
		660					665					670			

Thr Ile Ser Ala Lys Asp Val Thr Val Asn Ser Asn Ile Thr Ser His
 675 680 685
 Lys Thr Val Asn Ile Ser Ala Ser Glu Gly Gly Ile Thr Thr Lys Ala
 690 695 700
 Gly Thr Thr Ile Asn Ala Thr Thr Gly Ser Val Glu Val Thr Ala Lys
 705 710 715 720
 Thr Gly Asp Ile Ser Gly Thr Ile Ser Gly Lys Thr Val Ser Val Thr
 725 730 735
 Ala Thr Thr Asp Ser Leu Thr Val Lys Gly Gly Ala Lys Ile Asn Ala
 740 745 750
 Thr Glu Gly Thr Ala Thr Leu Thr Ala Ser Ser Gly Lys Leu Thr Thr
 755 760 765
 Glu Ala Asn Ser Ala Ile Ser Gly Ala Asn Gly Val Thr Ala Ser Ser
 770 775 780
 Gln Ser Gly Asp Ile Ser Gly Thr Ile Ser Gly Lys Thr Val Ser Val
 785 790 795 800
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 Ala Thr Glu Gly Ala Ala Thr Leu Thr Ala Thr Lys Gly Thr Leu Thr
 820 825 830
 Thr Val Lys Gly Ser Asn Ile Asp Ala Asn Glu Gly Thr Leu Val Ile
 835 840 845
 Asn Ala Gln Asp Ala Thr Leu Asn Gly Asp Ala Ser Gly Asp Arg Thr
 850 855 860
 Glu Val Asn Ala Val Asn Ala Ser Gly Ser Gly Asn Val Thr Ala Lys
 865 870 875 880
 Thr Ser Ser Ser Val Asn Ile Thr Gly Asp Leu Ser Thr Ile Asn Gly
 885 890 895
 Leu Asn Ile Ile Ser Lys Asn Gly Lys Asn Thr Val Val Leu Lys Gly
 900 905 910
 Ala Glu Ile Asp Val Lys Tyr Ile Gln Pro Gly Val Ala Ser Ala Asn
 915 920 925
 Glu Val Ile Glu Ala Lys Arg Ala Leu Glu Lys Val Lys Asp Leu Ser
 930 935 940
 Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val Ser Ala Val Arg
 945 950 955 960
 Phe Ile Glu Pro Asn Asn Thr Ile Thr Val Asn Thr Gln Asn Glu Phe
 965 970 975
 Thr Thr Arg Pro Ser Ser Gln Val Thr Ile Ser Glu Gly Lys Ala Cys
 980 985 990

Phe Ser Ser Gly Asn Gly Ala Ala Val Cys Thr Asn Val Ala Asp Asp
 995 1000 1005

Gly Gln Gln
 1010

<210> 40
 <211> 3018
 <212> DNA
 <213> Haemophilus influenzae

<400> 40
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 tccaccgctt tacaaaaggg tattgagggtc aacattttctg ccacaaaaaa tgtaaccgctc 180
 aacgcggatg ttgatgttaa aaacggaaca ttagtattac attcacaaaag gaatggagtt 240
 aaaattaacg gtaatattac ctcaacacaa aatggtaatt taaccattaa aacagggtggc 300
 aagggtgatg ttcataaaaa tatcacactt ggtatggggtt ttttgaatat tacttccgat 360
 aataacatca cctttgaaaa aggtgataat ctaaccatta ccgccaagg aaatataatc 420
 tctaatacaag agaataaaca acttagattt agtaatgtat ctttaaattgg gatgggtgcg 480
 ggtttaactt ttactgcaaa taaaggtaat catacccata agtttgatgg cacgcttaac 540
 atttccggaa aggtagtaat taatcaaacc acacctcaca acattgctcc atggaatgca 600
 agtgcagact cttactggaa tgtaactact cttactttag gtaataatgc gcaatttacc 660
 tttattaaat ttgtcgatag caaccgctcg gtagctctta atagcggttc aagaagtttt 720
 gcgggggtaa agttctacgg caagaataat gaaatgaaat ttaatatggg tgataatgct 780
 aatgttgaat tcaagttaaa atcaaagat aatacaagca acaacaaacc actaccaatt 840
 cagtttttat ctaatatctc agccactggg aatggcactg tatcttttga tatacatgcc 900
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 attgacggca atctttctat tgcagaaaagt gctaaatttc aaggaaaaac caataacaac 1380
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 atcaaggata ttaaagccaa cgccgaaatc caaattggcg gcaatatctc gcaaaaagaa 1620
 ggtaatctca cgatttcttc tgacaaaatt aatatcacca aacggataga aattaaggca 1680
 gatactgac aaggggaattc tgattcaggc gtagcaagta atgctaattc aaccattaaa 1740
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 acagctaaag ataacagtga ttttaattatt ggcaaggcta gcagtgacaa cagtaatgct 1860
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 gacaacaata tcggcttaac tatttccgca aaagatgtaa cggtaaatag taatatcacc 2040
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 acgatttccg gtaagacagt aagtggtaca gcaaccaccg acagtttaac tgttaaagggt 2220
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accgtagtgt taaaagggtgc tgaaattgat gtgaaatata ttcaaccagg tgtagcaagt 2760
gcgaatgagg ttattgaagc gaagcgtgcc cttgaaaaag taaaagattt atctgatgaa 2820
gaaagagaaa cattagctaa acttggtgta agtgctgtac gttttattga accaaataat 2880
accattacgg ttaacacaca aaatgagttt acaaccagac catcaagtca agtgacaatt 2940
tctgaaggta aggcgtgttt ctcaagtggg aatggcgcag cagtatgtac caatgttgct 3000
gacgatggac agcagtag                                     3018

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<210> 41

<211> 1005

<212> PRT

<213> Haemophilus influenzae

<400> 41

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Pro Asp Asp Ile Asn Ile Val Asn Gly Ser Asn Ile Asp Ala Gln Leu
  1           5           10           15

```

```

Gln Pro Gly Arg Gly Asp Thr Pro Asn Lys Val Ser Ala Glu Gly Leu
           20           25           30

```

```

Thr Ser Ile Asn Asn Ala Thr Leu Ser Thr Ala Leu Gln Lys Gly Ile
  35           40           45

```

```

Glu Val Asn Ile Ser Ala Thr Lys Asn Val Thr Val Asn Ala Asp Val
  50           55           60

```

```

Asp Val Lys Asn Gly Thr Leu Val Leu His Ser Gln Arg Asn Gly Val
  65           70           75           80

```

```

Lys Ile Asn Gly Asn Ile Thr Ser Thr Gln Asn Gly Asn Leu Thr Ile
           85           90           95

```

```

Lys Thr Gly Gly Lys Val Asp Val His Lys Asn Ile Thr Leu Gly Met
  100          105          110

```

```

Gly Phe Leu Asn Ile Thr Ser Asp Asn Asn Ile Thr Phe Glu Lys Gly
  115          120          125

```

```

Asp Asn Leu Thr Ile Thr Ala Gln Gly Asn Ile Ile Ser Asn Gln Glu
  130          135          140

```

```

Asn Lys Gln Leu Arg Phe Ser Asn Val Ser Leu Asn Gly Met Gly Ala
  145          150          155          160

```

```

Gly Leu Thr Phe Thr Ala Asn Lys Gly Asn His Thr His Lys Phe Asp
  165          170          175

```

```

Gly Thr Leu Asn Ile Ser Gly Lys Val Val Ile Asn Gln Thr Thr Pro
  180          185          190

```

```

His Asn Ile Ala Pro Trp Asn Ala Ser Ala Asp Ser Tyr Trp Asn Val
  195          200          205

```

```

Thr Thr Leu Thr Leu Gly Asn Asn Ala Gln Phe Thr Phe Ile Lys Phe
  210          215          220

```

```

Val Asp Ser Asn Arg Ser Val Ala Leu Asn Ser Gly Ser Arg Ser Phe
  225          230          235          240

```

Ala Gly Val Lys Phe Tyr Gly Lys Asn Asn Glu Met Lys Phe Asn Ile
245 250 255

Gly Asp Asn Ala Asn Val Glu Phe Lys Leu Lys Ser Asn Asp Asn Thr
260 265 270

Ser Asn Asn Lys Pro Leu Pro Ile Gln Phe Leu Ser Asn Ile Ser Ala
275 280 285

Thr Gly Asn Gly Thr Val Ser Phe Asp Ile His Ala Asn Leu Ser Ala
290 295 300

Arg Ser Thr Glu Leu Asn Met Ser Leu Ile Asn Ile Ser Asn Gly Val
305 310 315 320

Asn Phe Ser Ile Asn Ser His Val Arg Gly Asn Asn Ala Phe Glu Ile
325 330 335

Lys Lys Asp Leu Ile Ile Asn Ala Thr Gly Ser Asn Phe Asn Leu Lys
340 345 350

Gln Thr Lys Asp Lys Phe Asp Asn Ser Tyr Glu Lys Asn Ala Ile Phe
355 360 365

Ser Thr His Asn Leu Thr Ile Leu Gly Gly Asn Val Thr Leu Gly Gly
370 375 380

Glu Asn Ser Ser Ser Asn Ile Lys Gly Asn Ile Asn Ile Asn Ser Lys
385 390 395 400

Ala Asn Val Thr Leu Gln Ala His Ala Gly Thr Ser His Leu Asp Lys
405 410 415

Lys Glu Arg Thr Leu Thr Leu Gly Asn Val Ser Val Gly Gly Asn Leu
420 425 430

Asn Ile Ile Gly Ser Asn Ala His Ile Asp Gly Asn Leu Ser Ile Ala
435 440 445

Glu Ser Ala Lys Phe Gln Gly Lys Thr Asn Asn Asn Leu Asn Ile Thr
450 455 460

Gly Thr Phe Thr Asn Asn Gly Thr Ala Asp Ile Asn Ile Lys Gln Gly
465 470 475 480

Val Val Lys Leu Gln Gly Asp Ile Thr Asn Asn Gly Asn Leu Asn Ile
485 490 495

Thr Thr Asn Ala Ser Val Asn Gln Lys Thr Ile Ile Asn Gly Asn Ile
500 505 510

Thr Asn Lys Lys Gly Asp Leu Asn Ile Lys Asp Ile Lys Ala Asn Ala
515 520 525

Glu Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn Leu Thr
530 535 540

Ile Ser Ser Asp Lys Ile Asn Ile Thr Lys Arg Ile Glu Ile Lys Ala
545 550 555 560

Asp Thr Asp Gln Gly Asn Ser Asp Ser Gly Val Ala Ser Asn Ala Asn
 565 570 575
 Leu Thr Ile Lys Thr Lys Glu Leu Thr Leu Thr Asp Asn Leu Asn Ile
 580 585 590
 Ser Gly Phe Asn Lys Ala Glu Ile Thr Ala Lys Asp Asn Ser Asp Leu
 595 600 605
 Ile Ile Gly Lys Ala Ser Ser Asp Asn Ser Asn Ala Lys Gln Ile Thr
 610 615 620
 Phe Asp Lys Val Lys Asp Ser Lys Ile Ser Ala Gly Asn His Asn Val
 625 630 635 640
 Thr Leu Asn Ser Lys Val Glu Thr Ser Asn Ser Asp Gly Ser Thr Gly
 645 650 655
 Asn Gly Ser Asp Asp Asn Asn Ile Gly Leu Thr Ile Ser Ala Lys Asp
 660 665 670
 Val Thr Val Asn Ser Asn Ile Thr Ser His Lys Thr Val Asn Ile Ser
 675 680 685
 Ala Ser Glu Gly Gly Ile Thr Thr Lys Ala Gly Thr Thr Ile Asn Ala
 690 695 700
 Thr Thr Gly Ser Val Glu Val Thr Ala Lys Thr Gly Asp Ile Ser Gly
 705 710 715 720
 Thr Ile Ser Gly Lys Thr Val Ser Val Thr Ala Thr Thr Asp Ser Leu
 725 730 735
 Thr Val Lys Gly Gly Ala Lys Ile Asn Ala Thr Glu Gly Thr Ala Thr
 740 745 750
 Leu Thr Ala Ser Ser Gly Lys Leu Thr Thr Glu Ala Asn Ser Ala Ile
 755 760 765
 Ser Gly Ala Asn Gly Val Thr Ala Ser Ser Gln Ser Gly Asp Ile Ser
 770 775 780
 Gly Thr Ile Ser Gly Lys Thr Val Ser Val Thr Ala Ser Ser Gly Ser
 785 790 795 800
 Leu Thr Val Gly Gly Asp Ala Lys Ile Asn Ala Thr Glu Gly Ala Ala
 805 810 815
 Thr Leu Thr Ala Thr Lys Gly Thr Leu Thr Thr Val Lys Gly Ser Asn
 820 825 830
 Ile Asp Ala Asn Glu Gly Thr Leu Val Ile Asn Ala Gln Asp Ala Thr
 835 840 845
 Leu Asn Gly Asp Ala Ser Gly Asp Arg Thr Glu Val Asn Ala Val Asn
 850 855 860
 Ala Ser Gly Ser Gly Asn Val Thr Ala Lys Thr Ser Ser Ser Val Asn

865		870		875		880
Ile Thr Gly Asp	Leu Ser Thr Ile	Asn Gly Leu	Asn Ile Ile	Ser Lys		
	885		890		895	
Asn Gly Lys Asn	Thr Val Val Leu	Lys Gly Ala	Glu Ile Asp	Val Lys		
	900		905		910	
Tyr Ile Gln Pro	Gly Val Ala Ser	Ala Asn Glu	Val Ile Glu	Ala Lys		
	915		920		925	
Arg Ala Leu Glu	Lys Val Lys Asp	Leu Ser Asp	Glu Glu Arg	Glu Thr		
	930		935		940	
Leu Ala Lys Leu	Gly Val Ser Ala	Val Arg Phe	Ile Glu Pro	Asn Asn		
	945		950		955	
Thr Ile Thr Val	Asn Thr Gln Asn	Glu Phe Thr	Thr Arg Pro	Ser Ser		
	965		970		975	
Gln Val Thr Ile	Ser Glu Gly Lys	Ala Cys Phe	Ser Ser Gly	Asn Gly		
	980		985		990	
Ala Ala Val Cys	Thr Asn Val Ala	Asp Asp Gly	Gln Gln			
	995		1000		1005	

<210> 42

<211> 3306

<212> DNA

<213> Haemophilus influenzae

<400> 42

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aacgctcaaa acagaccaac aataacaaac acatctcttg agcaaattatt aaaaaatggc 180
acctttgtta acataaccgc caaaaataaa atcttagtta atagcgacat caatatcaaa 240
gagaactccc acctaatacct ctggagcgaa agagatggca acagcggcgt tcagattgat 300
ggcaatatta cttccgctac tggcggaagc ttaaccgttt actctagtgg ctgggttgat 360
gttcataaaa acattacact taattcaggg tacttaaaca ttacgactaa aagtggagat 420
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aaatacagcc aaaccaacaa taataaagat agcaatttcg aaaaccattt tagaggaact 600
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tttaacgtat ccggcctatt tgacaaccaa ggcaagtcaa acatttccat tgccaaagga 1500
ggggctcact ttaaagacat taataacact aagagttaa acattactac caactccgac 1560

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cggtag
3306

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<210> 43

<211> 1101

<212> PRT

<213> Haemophilus influenzae

<400> 43

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Lys Glu Trp Leu Leu Asp Pro Asp Glu Val Thr Ile Gly Ala Gly Asp
 1              5              10             15

```

```

Val Gly Arg Ser Asp Asp Ser Ser Asp Thr Ala Phe Pro Thr Gly Thr
      20              25              30

```

```

Gly Glu Arg Asn Ser Pro Lys Thr Asn Ala Gln Asn Arg Pro Thr Ile
      35              40              45

```

```

Thr Asn Thr Ser Leu Glu Gln Ile Leu Lys Asn Gly Thr Phe Val Asn
      50              55              60

```

```

Ile Thr Ala Lys Asn Lys Ile Leu Val Asn Ser Asp Ile Asn Ile Lys
      65              70              75             80

```

```

Glu Asn Ser His Leu Ile Leu Trp Ser Glu Arg Asp Gly Asn Ser Gly
      85              90              95

```

```

Val Gln Ile Asp Gly Asn Ile Thr Ser Ala Thr Gly Gly Ser Leu Thr
      100             105             110

```

Val Tyr Ser Ser Gly Trp Val Asp Val His Lys Asn Ile Thr Leu Asn
 115 120 125
 Ser Gly Tyr Leu Asn Ile Thr Thr Lys Ser Gly Asp Val Ala Phe Glu
 130 135 140
 Gln Gly Asn Asp Leu Thr Ile Thr Gly Gln Gly Thr Ile Thr Ala Ser
 145 150 155 160
 Lys Lys Gly Phe Arg Phe Asp Asn Val Thr Leu Ser Gly Val Lys Lys
 165 170 175
 Gly Phe Leu Phe Lys Tyr Ser Gln Thr Asn Asn Asn Lys Asp Ser Asn
 180 185 190
 Phe Glu Asn His Phe Arg Gly Thr Leu Asn Ile Ser Gly Lys Val Asp
 195 200 205
 Ile Leu Met Gln Ala Arg Gln Glu Asn Trp Asn Arg Arg His Ser Gly
 210 215 220
 Arg Ser His Trp Asn Val Thr Arg Leu Asn Val Ser Thr Asn Ser Tyr
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 Leu Asn Ile Thr Ile Asp Asn Ser Gly Ser Arg Pro Ser Pro Gly Ala
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 Gly Pro Leu Tyr Arg Arg Ser Gly Leu Asn Gly Ile Ser Phe Asn Asn
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 Asp Thr Val Phe Asn Val Ala Ser Gly Ser Ala Val Asn Phe Ser Ile
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 Lys Pro Pro Ile Val Ser Asn Val His Asp Gly Asn His Thr Leu Phe
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 Asn Gly Asn Val Ser Val Leu Gly Gly Gly Asp Val Asn Phe His Phe
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 Asn Ala Ser Ser Ser Asn His Trp Thr His Gly Val Val Ile Lys Ser
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 Asn Leu Gln Lys Ser Leu Val Ala Asn Lys Asn Ile Thr Phe Glu Gly
 385 390 395 400
 Gly Asn Ile Thr Leu Ala Ala Asp Lys Lys Pro Ile Glu Ile Lys Gly
 405 410 415
 Asn Ile Thr Val Lys Glu Gly Ala Asn Val Thr Leu Arg Ser Ala Asn
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Tyr Gly Asn Asp Lys Ser Ala Leu Ser Ile Arg Gly Asn Val Thr Asn
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 Lys Gly Asn Leu Thr Val Thr Gly Ser Ala Ile Asn Ile Glu Lys Asn
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 Ala Lys Asn Ile Thr Val Asn Asn Asn Ile Thr Ser His Lys Thr Val
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 Lys Gly Lys Val Glu Ser Thr Ser Gly Ser Val Thr Leu Thr Ala Thr

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<211> 3288

<212> DNA

<213> Haemophilus influenzae

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<210> 45

<211> 1095

<212> PRT

<213> Haemophilus influenzae

<400> 45

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Lys Thr Asn Ala Gln Asn Arg Pro Thr Ile Thr Asn Thr Ser Leu Glu
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Gln Ile Leu Lys Asn Gly Thr Phe Val Asn Ile Thr Ala Lys Asn Lys
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Ile Leu Val Asn Ser Asp Ile Asn Ile Lys Glu Asn Ser His Leu Ile
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Leu Trp Ser Glu Arg Asp Gly Asn Ser Gly Val Gln Ile Asp Gly Asn
85 90 95

Ile Thr Ser Ala Thr Gly Gly Ser Leu Thr Val Tyr Ser Ser Gly Trp
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Val Asp Val His Lys Asn Ile Thr Leu Asn Ser Gly Tyr Leu Asn Ile
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Thr Thr Lys Ser Gly Asp Val Ala Phe Glu Gln Gly Asn Asp Leu Thr
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Ile Thr Gly Gln Gly Thr Ile Thr Ala Ser Lys Lys Gly Phe Arg Phe
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Asp Asn Val Thr Leu Ser Gly Val Lys Lys Gly Phe Leu Phe Lys Tyr
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Ser Gln Thr Asn Asn Asn Lys Asp Ser Asn Phe Glu Asn His Phe Arg
180 185 190

Gly Thr Leu Asn Ile Ser Gly Lys Val Asp Ile Leu Met Gln Ala Arg
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Gln Glu Asn Trp Asn Arg Arg His Ser Gly Arg Ser His Trp Asn Val
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 Ala Ser Gly Ser Ala Val Asn Phe Ser Ile Lys Pro Pro Ile Val Ser
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<211> 3240

<212> DNA

<213> Haemophilus influenzae

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<210> 47

<211> 1079

<212> PRT

<213> Haemophilus influenzae

<400> 47

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Ala	Glu	Arg	Thr	Asp	Thr	Gly	Glu	Asp	Val	Glu	Tyr	Thr	Gly	Thr	Gly
			20					25					30		
Ala	Asp	Ile	Asn	His	Gln	Lys	Gln	Asn	Ser	Glu	Thr	Lys	Ser	Thr	Leu
		35					40					45			
Thr	Asn	Thr	Thr	Leu	Glu	Gly	Met	Leu	Lys	Arg	Gly	Leu	Phe	Val	Asn
	50					55					60				
Ile	Thr	Ala	Arg	Asn	Lys	Ile	Arg	Val	Asn	Ser	Thr	Ile	Asn	Ile	Gly
65					70					75					80
Asp	Ser	Gly	His	Leu	Thr	Leu	Tyr	Lys	Lys	Arg	Lys	Asn	Arg	Ser	Asp
				85					90					95	
Gly	Ile	Gln	Ile	Asn	Lys	Asp	Ile	Thr	Ser	Thr	Gly	Gly	Ser	Leu	Thr
			100					105					110		
Ile	Asn	Ser	Asp	Asp	Trp	Val	Asp	Ile	His	Gly	Asn	Ile	Thr	Leu	Gly
	115						120					125			
Glu	Gly	Phe	Leu	Asn	Ile	Thr	Ser	Ser	Asp	Ser	Val	Ala	Phe	Glu	Gly
	130					135					140				
Gly	Asn	Gly	Asn	Lys	Gly	Arg	Ser	Ser	Ala	Ser	Ala	Gln	Ile	Ile	Ala
145				150						155					160
Gln	Gly	Thr	Ile	Thr	Leu	Thr	Gly	Glu	Asn	Lys	Thr	Phe	Arg	Leu	Asn
				165					170					175	
Asn	Val	Ser	Leu	Asn	Gly	Thr	Gly	Asn	Gly	Leu	Ser	Ile	Ile	Ser	Thr
			180					185					190		
Ala	Ser	Asn	Leu	Ser	His	Arg	Leu	Asp	Gly	Glu	Ile	Asn	Val	Ser	Gly
		195					200					205			
Asn	Val	Thr	Ile	Asn	Gln	Thr	Thr	Gln	Gln	Asn	Ile	Glu	Tyr	Trp	Lys
	210					215					220				
Ala	Ser	Ser	Asp	Ser	Tyr	Trp	Asn	Val	Thr	Ser	Phe	Asn	Leu	Arg	Glu
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Asp	Ser	Lys	Phe	Thr	Phe	Ile	Lys	Tyr	Val	Asn	Ser	Ala	Arg	Asn	Gly
			245						250					255	
Asp	Val	Arg	Gly	Arg	Ser	Phe	Ala	Gly	Val	Ile	Phe	Asn	Ala	Lys	Gly
			260					265					270		
Leu	Thr	Thr	Ser	Phe	Asn	Val	Lys	Lys	Gly	Ser	Thr	Val	Asp	Phe	Lys
		275					280					285			
Leu	Lys	Pro	Asn	Ser	Gly	Tyr	Asn	Ser	Gln	Lys	Arg	Ile	Pro	Ile	Gln
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Phe	Gln	Ser	Asn	Ile	Ser	Val	Ser	Gly	Gly	Gly	Arg	Val	Asn	Ile	Asn

305		310		315		320
Thr Leu Ala Asn	Leu Thr Gly Gly Gly	Val Glu Ile Arg Ser Ser Ser				
	325	330				335
Ile Asn Val Ser Asp Gly Ser Thr Leu Ser Met Thr Ala Gln Ala Arg		345				350
	340					
Asp Arg Asn Ala Phe Glu Ile Thr Lys Asp Leu Val Ile Asn Ala Ser		360				365
	355					
Asn Ser Asn Leu Ser Ile Ile Gln Gln Asn Asp Gly Phe Asp Asn Asn		375				380
	370					
Gln Lys Ala Asn Ala Ile Asn Ser Lys Tyr Asn Val Thr Ile Gln Gly		390				400
	385					
Gly Asn Val Thr Leu Gly Gly Gln Asn Ser Ser Ser Thr Ile Thr Gly		410				415
	405					
Ser Val Asn Ile Gly Ala Asn Ala Asn Val Thr Leu Gln Ala His Asn		425				430
	420					
Gly Asn Asp Arg Asn Lys Lys Leu Thr Phe Gly Asn Val Ser Val Glu		440				445
	435					
Gly Glu Leu Arg Leu Val Gly Ala Ser Ala Asn Ile Asn Asn Asn Leu		455				460
	450					
Ser Val Lys Ser Gly Ala Lys Phe Lys Ala Glu Thr Asn Asp Asn Leu		470				480
	465					
Asn Ile Thr Gly Thr Phe Thr Asn Asn Gly Thr Ser Ile Ile Asp Val		490				495
	485					
Lys Lys Gly Ala Ala Lys Leu Gly Asn Ile Thr Asn Asp Gly Asn Leu		505				510
	500					
Asn Ile Thr Thr Asn Ala Lys Asn Gly Gln Lys Ser Val Ile Asn Gly		520				525
	515					
Asn Ile Thr Asn Asn Lys Gly Ala Leu Asn Ile Thr Asn Asn Gly Asn		535				540
	530					
Asp Thr Glu Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn		550				560
	545					
Leu Thr Ile Ser Ser Asp Lys Ile Asn Ile Thr Lys Arg Ile Glu Ile		570				575
	565					
Lys Ala Gly Thr Asp Gln Gly Asn Ser Asp Ser Gly Val Ala Ser Asn		585				590
	580					
Ala Asn Leu Thr Ile Lys Thr Lys Glu Leu Lys Leu Thr Glu Asn Leu		600				605
	595					
Asn Ile Ser Gly Phe Asp Lys Ala Glu Ile Val Ala Lys Glu Asn Asn		615				620
	610					

Asn	Leu	Ile	Ile	Gly	Asn	Asn	Asn	Gly	Asp	Asn	Ala	Asn	Ala	Lys	Thr	625	630	635	640
Val	Thr	Phe	Asn	Asn	Val	Lys	Asp	Ser	Lys	Ile	Ser	Ala	Asn	Gly	His	645	650	655	
Asn	Val	Thr	Leu	Asn	Ser	Lys	Val	Glu	Thr	Ser	Asp	Gly	Asn	Ser	Asn	660	665	670	
Thr	Glu	Gly	Asn	Ser	Asp	Asn	Asn	Ala	Gly	Leu	Thr	Ile	Asp	Ala	Lys	675	680	685	
Asn	Val	Thr	Val	Asn	Asn	Asp	Ile	Thr	Ser	His	Lys	Thr	Val	Asn	Ile	690	695	700	
Thr	Ala	Ser	Glu	Arg	Ile	Asp	Thr	Lys	Ala	Asp	Thr	Thr	Ile	Asn	Ala	705	710	715	720
Thr	Thr	Gly	Asn	Val	Lys	Leu	Thr	Ala	Val	Thr	Ser	Asp	Ile	Gln	Gly	725	730	735	
Gly	Ile	Lys	Ser	Asn	Ser	Gly	Asp	Val	Asn	Ile	Thr	Thr	Ser	Thr	Gly	740	745	750	
Ser	Ile	Asn	Gly	Lys	Ile	Glu	Ser	Lys	Ser	Gly	Ser	Val	Thr	Leu	Thr	755	760	765	
Ala	Thr	Glu	Lys	Thr	Leu	Thr	Val	Gly	Asn	Val	Ser	Gly	Asn	Thr	Val	770	775	780	
Thr	Val	Thr	Ala	Asn	Arg	Gly	Ala	Leu	Thr	Thr	Leu	Ala	Gly	Ser	Thr	785	790	795	800
Ile	Asn	Gly	Thr	Asn	Gly	Val	Thr	Thr	Ser	Ser	Gln	Ser	Gly	Glu	Ile	805	810	815	
Gly	Gly	Glu	Val	Thr	Gly	Lys	Thr	Val	Ser	Val	Thr	Ala	Thr	Ala	Gly	820	825	830	
Ser	Leu	Thr	Val	Lys	Gly	Gly	Ala	Lys	Ile	Asn	Ala	Thr	Glu	Gly	Thr	835	840	845	
Ala	Thr	Leu	Thr	Ala	Ser	Ser	Gly	Lys	Leu	Thr	Thr	Glu	Ala	Ser	Ser	850	855	860	
Asn	Ile	Thr	Ser	Ala	Lys	Gly	Gln	Val	Asp	Leu	Ser	Ala	Gln	Asp	Gly	865	870	875	880
Ser	Ile	Ala	Gly	Gln	Ile	Ser	Ala	Ala	Asn	Val	Thr	Leu	Asn	Thr	Thr	885	890	895	
Gly	Thr	Leu	Thr	Thr	Val	Glu	Gly	Ser	Ser	Ile	Asn	Ala	Asn	Glu	Gly	900	905	910	
Thr	Leu	Val	Ile	Asn	Ala	Asn	Asp	Ala	Lys	Leu	Asp	Gly	Lys	Ala	Ser	915	920	925	
Gly	Asn	Arg	Thr	Glu	Val	Asn	Ala	Thr	Asn	Ala	Ser	Gly	Ser	Gly	Ser	930	935	940	

Val Thr Ala Lys Thr Ser Ser Ser Val Asn Ile Thr Gly Asp Leu Asn
945 950 955 960

Thr Ile Asn Gly Leu Asn Ile Ile Ser Glu Asn Gly Arg Asn Thr Val
965 970 975

Arg Leu Arg Gly Lys Glu Ile Glu Val Lys Tyr Ile Gln Pro Gly Val
980 985 990

Ala Ser Val Glu Glu Val Ile Glu Ala Lys Arg Val Leu Glu Lys Val
995 1000 1005

Lys Asp Leu Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val
1010 1015 1020

Ser Ala Val Arg Phe Ile Glu Pro Asn Asn Thr Ile Thr Val Asn Thr
1025 1030 1035 1040

Gln Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln Val Thr Ile Ser Glu
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<210> 48

<211> 3222

<212> DNA

<213> Haemophilus influenzae

<400> 48

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gccagaaata aaatccgagt taatagcacc atcaatatcg gggatagcgg ccatttaacc 240
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<210> 49

<211> 1073

<212> PRT

<213> Haemophilus influenzae

<400> 49

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      20              25              30

Lys Gln Asn Ser Glu Thr Lys Ser Thr Leu Thr Asn Thr Thr Leu Glu
      35              40              45

Gly Met Leu Lys Arg Gly Leu Phe Val Asn Ile Thr Ala Arg Asn Lys
      50              55              60

Ile Arg Val Asn Ser Thr Ile Asn Ile Gly Asp Ser Gly His Leu Thr
      65              70              75              80

Leu Tyr Lys Lys Arg Lys Asn Arg Ser Asp Gly Ile Gln Ile Asn Lys
      85              90              95

Asp Ile Thr Ser Thr Gly Gly Ser Leu Thr Ile Asn Ser Asp Asp Trp
      100              105              110

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Thr	Ser	Ser	Asp	Ser	Val	Ala	Phe	Glu	Gly	Gly	Asn	Gly	Asn	Lys	Gly
	130					135					140				
Arg	Ser	Ser	Ala	Ser	Ala	Gln	Ile	Ile	Ala	Gln	Gly	Thr	Ile	Thr	Leu
145					150					155					160
Thr	Gly	Glu	Asn	Lys	Thr	Phe	Arg	Leu	Asn	Asn	Val	Ser	Leu	Asn	Gly
				165					170					175	
Thr	Gly	Asn	Gly	Leu	Ser	Ile	Ile	Ser	Thr	Ala	Ser	Asn	Leu	Ser	His
			180					185					190		
Arg	Leu	Asp	Gly	Glu	Ile	Asn	Val	Ser	Gly	Asn	Val	Thr	Ile	Asn	Gln
		195					200					205			
Thr	Thr	Gln	Gln	Asn	Ile	Glu	Tyr	Trp	Lys	Ala	Ser	Ser	Asp	Ser	Tyr
		210				215						220			
Trp	Asn	Val	Thr	Ser	Phe	Asn	Leu	Arg	Glu	Asp	Ser	Lys	Phe	Thr	Phe
225					230					235					240
Ile	Lys	Tyr	Val	Asn	Ser	Ala	Arg	Asn	Gly	Asp	Val	Arg	Gly	Arg	Ser
				245					250					255	
Phe	Ala	Gly	Val	Ile	Phe	Asn	Ala	Lys	Gly	Leu	Thr	Thr	Ser	Phe	Asn
			260					265						270	
Val	Lys	Lys	Gly	Ser	Thr	Val	Asp	Phe	Lys	Leu	Lys	Pro	Asn	Ser	Gly
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Tyr	Asn	Ser	Gln	Lys	Arg	Ile	Pro	Ile	Gln	Phe	Gln	Ser	Asn	Ile	Ser
	290					295					300				
Val	Ser	Gly	Gly	Gly	Arg	Val	Asn	Ile	Asn	Thr	Leu	Ala	Asn	Leu	Thr
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Gly	Gly	Gly	Val	Glu	Ile	Arg	Ser	Ser	Ser	Ile	Asn	Val	Ser	Asp	Gly
				325					330					335	
Ser	Thr	Leu	Ser	Met	Thr	Ala	Gln	Ala	Arg	Asp	Arg	Asn	Ala	Phe	Glu
			340					345					350		
Ile	Thr	Lys	Asp	Leu	Val	Ile	Asn	Ala	Ser	Asn	Ser	Asn	Leu	Ser	Ile
		355					360						365		
Ile	Gln	Gln	Asn	Asp	Gly	Phe	Asp	Asn	Asn	Gln	Lys	Ala	Asn	Ala	Ile
	370					375					380				
Asn	Ser	Lys	Tyr	Asn	Val	Thr	Ile	Gln	Gly	Gly	Asn	Val	Thr	Leu	Gly
385					390					395					400
Gly	Gln	Asn	Ser	Ser	Ser	Thr	Ile	Thr	Gly	Ser	Val	Asn	Ile	Gly	Ala
				405					410					415	
Asn	Ala	Asn	Val	Thr	Leu	Gln	Ala	His	Asn	Gly	Asn	Asp	Arg	Asn	Lys
			420					425					430		

Lys Leu Thr Phe Gly Asn Val Ser Val Glu Gly Glu Leu Arg Leu Val
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 Gly Ala Ser Ala Asn Ile Asn Asn Asn Leu Ser Val Lys Ser Gly Ala
 450 455 460
 Lys Phe Lys Ala Glu Thr Asn Asp Asn Leu Asn Ile Thr Gly Thr Phe
 465 470 475 480
 Thr Asn Asn Gly Thr Ser Ile Ile Asp Val Lys Lys Gly Ala Ala Lys
 485 490 495
 Leu Gly Asn Ile Thr Asn Asp Gly Asn Leu Asn Ile Thr Thr Asn Ala
 500 505 510
 Lys Asn Gly Gln Lys Ser Val Ile Asn Gly Asn Ile Thr Asn Asn Lys
 515 520 525
 Gly Ala Leu Asn Ile Thr Asn Asn Gly Asn Asp Thr Glu Ile Gln Ile
 530 535 540
 Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn Leu Thr Ile Ser Ser Asp
 545 550 555 560
 Lys Ile Asn Ile Thr Lys Arg Ile Glu Ile Lys Ala Gly Thr Asp Gln
 565 570 575
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 580 585 590
 Thr Lys Glu Leu Lys Leu Thr Glu Asn Leu Asn Ile Ser Gly Phe Asp
 595 600 605
 Lys Ala Glu Ile Val Ala Lys Glu Asn Asn Asn Leu Ile Ile Gly Asn
 610 615 620
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 625 630 635 640
 Lys Asp Ser Lys Ile Ser Ala Asn Gly His Asn Val Thr Leu Asn Ser
 645 650 655
 Lys Val Glu Thr Ser Asp Gly Asn Ser Asn Thr Glu Gly Asn Ser Asp
 660 665 670
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 675 680 685
 Asp Ile Thr Ser His Lys Thr Val Asn Ile Thr Ala Ser Glu Arg Ile
 690 695 700
 Asp Thr Lys Ala Asp Thr Thr Ile Asn Ala Thr Thr Gly Asn Val Lys
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 Leu Thr Ala Val Thr Ser Asp Ile Gln Gly Gly Ile Lys Ser Asn Ser
 725 730 735
 Gly Asp Val Asn Ile Thr Thr Ser Thr Gly Ser Ile Asn Gly Lys Ile

740					745					750					
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Thr	Val	Gly	Asn	Val	Ser	Gly	Asn	Thr	Val	Thr	Val	Thr	Ala	Asn	Arg
	770					775					780				
Gly	Ala	Leu	Thr	Thr	Leu	Ala	Gly	Ser	Thr	Ile	Asn	Gly	Thr	Asn	Gly
785						790					795				800
Val	Thr	Thr	Ser	Ser	Gln	Ser	Gly	Glu	Ile	Gly	Gly	Glu	Val	Thr	Gly
				805					810					815	
Lys	Thr	Val	Ser	Val	Thr	Ala	Thr	Ala	Gly	Ser	Leu	Thr	Val	Lys	Gly
			820					825					830		
Gly	Ala	Lys	Ile	Asn	Ala	Thr	Glu	Gly	Thr	Ala	Thr	Leu	Thr	Ala	Ser
		835					840					845			
Ser	Gly	Lys	Leu	Thr	Thr	Glu	Ala	Ser	Ser	Asn	Ile	Thr	Ser	Ala	Lys
	850					855					860				
Gly	Gln	Val	Asp	Leu	Ser	Ala	Gln	Asp	Gly	Ser	Ile	Ala	Gly	Gln	Ile
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Ser	Ala	Ala	Asn	Val	Thr	Leu	Asn	Thr	Thr	Gly	Thr	Leu	Thr	Thr	Val
			885						890					895	
Glu	Gly	Ser	Ser	Ile	Asn	Ala	Asn	Glu	Gly	Thr	Leu	Val	Ile	Asn	Ala
			900					905					910		
Asn	Asp	Ala	Lys	Leu	Asp	Gly	Lys	Ala	Ser	Gly	Asn	Arg	Thr	Glu	Val
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Asn	Ala	Thr	Asn	Ala	Ser	Gly	Ser	Gly	Ser	Val	Thr	Ala	Lys	Thr	Ser
		930				935					940				
Ser	Ser	Val	Asn	Ile	Thr	Gly	Asp	Leu	Asn	Thr	Ile	Asn	Gly	Leu	Asn
945				950							955				960
Ile	Ile	Ser	Glu	Asn	Gly	Arg	Asn	Thr	Val	Arg	Leu	Arg	Gly	Lys	Glu
			965					970						975	
Ile	Glu	Val	Lys	Tyr	Ile	Gln	Pro	Gly	Val	Ala	Ser	Val	Glu	Glu	Val
			980					985					990		
Ile	Glu	Ala	Lys	Arg	Val	Leu	Glu	Lys	Val	Lys	Asp	Leu	Ser	Asp	Glu
		995				1000					1005				
Glu	Arg	Glu	Thr	Leu	Ala	Lys	Leu	Gly	Val	Ser	Ala	Val	Arg	Phe	Ile
	1010					1015					1020				
Glu	Pro	Asn	Asn	Thr	Ile	Thr	Val	Asn	Thr	Gln	Asn	Glu	Phe	Thr	Thr
1025				1030					1035					1040	
Arg	Pro	Ser	Ser	Gln	Val	Thr	Ile	Ser	Glu	Gly	Lys	Ala	Cys	Phe	Ser
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Gln

<210> 50
 <211> 2952
 <212> DNA
 <213> Haemophilus influenzae

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 catgcaggct ctatagaaca atctttgatg aagggtgggt cagttaatat ttctgctaca 180
 aataaagtaa atgttactac agatattaat gtttataatg gagcattaac gttacactca 240
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 aatattactt ccggtgatat cgccttcgaa aaaggtaata atctaaccat taccgctcaa 420
 ggaaatataa cctctaataa agacggaaaa caacttagac ttaataatgt atctttaaat 480
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 ggcgcgatta acatttcgag agtagtaacg attaatcaaa ctacgaaaaa aaacgctaag 600
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 <211> 983
 <212> PRT
 <213> Haemophilus influenzae

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 35 40 45
 Leu Met Lys Gly Gly Ala Val Asn Ile Ser Ala Thr Asn Lys Val Asn
 50 55 60
 Val Thr Thr Asp Ile Asn Val Tyr Asn Gly Ala Leu Thr Leu His Ser
 65 70 75 80
 Glu Arg Asp Gly Val Glu Ile Asn Gly Asn Ile Thr Ser Glu Lys Asn
 85 90 95
 Gly Asn Leu Thr Ile Lys Ala Gly Ser Trp Val Asp Val His Lys Asn
 100 105 110
 Ile Thr Leu Gly Glu Gly Phe Leu Asn Ile Thr Ser Gly Asp Ile Ala
 115 120 125
 Phe Glu Lys Gly Asn Asn Leu Thr Ile Thr Ala Gln Gly Asn Ile Thr
 130 135 140
 Ser Asn Lys Asp Gly Lys Gln Leu Arg Leu Asn Asn Val Ser Leu Asn
 145 150 155 160
 Gly Thr Gly Ala Gly Leu Asn Phe Ile Ala Asn Gln Asn Asn Phe Thr
 165 170 175
 His Asn Ile Ser Gly Ala Ile Asn Ile Ser Gly Val Val Thr Ile Asn
 180 185 190
 Gln Thr Thr Lys Lys Asn Ala Lys Ala Trp Asn Thr Ser Tyr Asp Ser
 195 200 205
 Tyr Trp Asn Val Ser Thr Leu Thr Leu Ser Asn Asp Ala Lys Phe Thr
 210 215 220
 Phe Ile Lys Tyr Val Asp Ser Asn His Ser Thr Asn Ser Ser Asp Ser
 225 230 235 240
 Arg Ser Phe Ala Gly Val Lys Phe His Gly Lys Asn Asn Glu Met Lys
 245 250 255

Phe Asn Ile Gly Asn Asn Ala Lys Ala Glu Phe Arg Leu Lys Pro Asn
 260 265 270
 Glu Lys Thr Thr Pro Asn Arg Pro Leu Pro Ile Gln Phe Leu Ser Asn
 275 280 285
 Ile Ser Val Thr Gly Gly Gly Ser Val Phe Phe Asp Ile Tyr Ala Asn
 290 295 300
 Leu Trp Gly Lys Gly Thr Glu Leu Lys Met Asp Ser Ile Asn Val Ser
 305 310 315 320
 Ser Gly Ser Asn Leu Thr Leu Asn Ser His Val Arg Lys Tyr Asn Ala
 325 330 335
 Phe Glu Ile Asn Lys Asp Leu Thr Ile Asn Ala Thr Asn Ser Asn Phe
 340 345 350
 Asn Leu Arg Gln Thr Ser Asp Ser Phe Arg Asn Gly Tyr Arg Asn Asn
 355 360 365
 Ala Ile Asn Ser Thr His Asn Ile Ser Ile Leu Gly Gly Asn Val Thr
 370 375 380
 Leu Gly Gly Gln Asn Ser Ser Ser Ser Ile Met Gly Asn Ile Ile Ile
 385 390 395 400
 Lys Arg Ala Ala Asn Val Thr Leu Glu Ala Asp Asn Ser His Asn Ser
 405 410 415
 Asp Asn Val Lys Asp Arg Thr Ile Asn Leu Gly Asn Leu Thr Val Glu
 420 425 430
 Gly Asn Leu Ser Leu Ile Gly Glu Asn Ala Asn Ile Asn Gly Asn Leu
 435 440 445
 Ser Ile Glu Lys Glu Ala Ile Phe Lys Gly Lys Thr Lys Asp Ser Leu
 450 455 460
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 465 470 475 480
 Ser Gln Gly Val Val Ser Leu Gly Asp Ile Thr Asn Asp Gly Lys Leu
 485 490 495
 Asn Ile Thr Thr His Ala Lys Ser Gly Gln Lys Ser Ile Ile Arg Gly
 500 505 510
 Asp Ile Ile Asn Lys Gln Gly Asn Leu Asn Ile Thr Asp Asn Asn Ser
 515 520 525
 Asn Ala Glu Ile Glu Ile Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn
 530 535 540
 Leu Thr Ile Ser Ser Asp Lys Val Asn Ile Thr Lys Gln Ile Thr Ile
 545 550 555 560
 Lys Ala Gly Val Asp Gly Glu Ser Ser Ser Ser Ser Thr Ala Ser Asp

565					570					575					
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			580					585					590		
Asn	Ile	Ser	Gly	Phe	Asn	Lys	Ala	Glu	Ile	Thr	Ala	Lys	Asp	Asn	Ser
		595					600					605			
Asp	Leu	Ile	Ile	Gly	Lys	Ala	Ser	Ser	Asp	Asn	Ser	Asn	Ala	Lys	Gln
	610					615					620				
Val	Thr	Phe	Asp	Lys	Val	Lys	Asp	Ser	Lys	Ile	Ser	Ala	Gly	Asn	His
	625					630					635				640
Asn	Val	Thr	Leu	Asn	Ser	Lys	Val	Glu	Thr	Ser	Asn	Ser	Asp	Gly	Ser
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Thr	Gly	Asn	Gly	Ser	Asp	Asp	Asn	Asn	Ile	Gly	Leu	Thr	Ile	Ser	Ala
			660					665					670		
Lys	Asp	Val	Thr	Val	Asn	Ser	Asn	Ile	Thr	Ser	His	Lys	Thr	Val	Asn
		675					680					685			
Ile	Ser	Ala	Ser	Glu	Gly	Gly	Ile	Thr	Thr	Lys	Ala	Gly	Thr	Thr	Ile
	690					695					700				
Asn	Ala	Thr	Thr	Gly	Ser	Val	Glu	Val	Thr	Ala	Lys	Thr	Gly	Asp	Ile
	705					710					715				720
Ser	Gly	Thr	Ile	Ser	Gly	Lys	Thr	Val	Ser	Val	Thr	Ala	Ser	Thr	Gly
				725					730					735	
Asp	Leu	Thr	Val	Arg	Lys	Ala	Ala	Thr	Ile	Ser	Ala	Thr	Glu	Gly	Ala
			740					745					750		
Ala	Thr	Leu	Thr	Ala	Thr	Gly	Asn	Thr	Leu	Thr	Thr	Glu	Ala	Gly	Ser
		755					760					765			
Ser	Ile	Thr	Ser	Thr	Lys	Gly	Gln	Val	Asp	Leu	Ser	Ala	Gln	Asp	Gly
	770					775					780				
Ser	Ile	Ala	Gly	Gln	Ile	Ser	Ala	Ala	Asn	Val	Thr	Leu	Asn	Thr	Thr
	785					790					795				800
Gly	Thr	Leu	Thr	Thr	Val	Glu	Gly	Ser	Asn	Ile	Lys	Ala	Thr	Ser	Gly
				805					810					815	
Thr	Leu	Ala	Ile	Asn	Ala	Lys	Asp	Ala	Lys	Leu	Asp	Gly	Thr	Ala	Ser
			820					825					830		
Gly	Asn	Arg	Thr	Glu	Val	Asn	Ala	Thr	Asn	Ala	Ser	Gly	Ser	Gly	Ser
		835					840					845			
Val	Thr	Ala	Lys	Thr	Ser	Ser	Asn	Val	Asn	Ile	Thr	Gly	Asp	Leu	Ser
	850					855					860				
Thr	Ile	Asn	Gly	Leu	Asn	Ile	Ile	Ser	Glu	Asn	Gly	Arg	Asn	Thr	Val
	865					870					875				880

Arg Leu Arg Gly Lys Glu Ile Asp Val Lys Tyr Ile Gln Pro Gly Val
 885 890 895

Ala Ser Val Glu Glu Val Ile Glu Ala Lys Arg Val Leu Glu Lys Val
 900 905 910

Lys Asp Leu Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val
 915 920 925

Ser Ala Val Arg Phe Val Glu Pro Asn Asn Ala Ile Thr Ile Asn Thr
 930 935 940

Gln Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln Val Ile Ile Ser Glu
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Gly Lys Ala Cys Phe Ser Ser Gly Asn Gly Ala Ala Val Cys Thr Asn
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Val Ala Asp Asp Gly Gln Pro
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<210> 52

<211> 2934

<212> DNA

<213> Haemophilus influenzae

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<210> 53

<211> 977

<212> PRT

<213> Haemophilus influenzae

<400> 53

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Val Val Arg Gly Asp Ser Ile Glu Lys Lys Asn Ala Pro Thr Lys Thr
      20              25              30

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Thr Ile His Ala Gly Ser Ile Glu Gln Ser Leu Met Lys Gly Gly Ala
      35              40              45

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Val Asn Ile Ser Ala Thr Asn Lys Val Asn Val Thr Thr Asp Ile Asn
      50              55              60

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Val Tyr Asn Gly Ala Leu Thr Leu His Ser Glu Arg Asp Gly Val Glu
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Ile Asn Gly Asn Ile Thr Ser Glu Lys Asn Gly Asn Leu Thr Ile Lys
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Ala Gly Ser Trp Val Asp Val His Lys Asn Ile Thr Leu Gly Glu Gly
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Phe Leu Asn Ile Thr Ser Gly Asp Ile Ala Phe Glu Lys Gly Asn Asn
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Leu Thr Ile Thr Ala Gln Gly Asn Ile Thr Ser Asn Lys Asp Gly Lys
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Gln Leu Arg Leu Asn Asn Val Ser Leu Asn Gly Thr Gly Ala Gly Leu
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Asn Phe Ile Ala Asn Gln Asn Asn Phe Thr His Asn Ile Ser Gly Ala
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		195					200					205			
Leu	Thr	Leu	Ser	Asn	Asp	Ala	Lys	Phe	Thr	Phe	Ile	Lys	Tyr	Val	Asp
	210					215					220				
Ser	Asn	His	Ser	Thr	Asn	Ser	Ser	Asp	Ser	Arg	Ser	Phe	Ala	Gly	Val
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Lys	Phe	His	Gly	Lys	Asn	Asn	Glu	Met	Lys	Phe	Asn	Ile	Gly	Asn	Asn
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			260					265						270	
Arg	Pro	Leu	Pro	Ile	Gln	Phe	Leu	Ser	Asn	Ile	Ser	Val	Thr	Gly	Gly
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Leu	Asn	Ser	His	Val	Arg	Lys	Tyr	Asn	Ala	Phe	Glu	Ile	Asn	Lys	Asp
				325					330					335	
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Asp	Ser	Phe	Arg	Asn	Gly	Tyr	Arg	Asn	Asn	Ala	Ile	Asn	Ser	Thr	His
		355					360					365			
Asn	Ile	Ser	Ile	Leu	Gly	Gly	Asn	Val	Thr	Leu	Gly	Gly	Gln	Asn	Ser
	370					375					380				
Ser	Ser	Ser	Ile	Met	Gly	Asn	Ile	Ile	Ile	Lys	Arg	Ala	Ala	Asn	Val
385					390					395					400
Thr	Leu	Glu	Ala	Asp	Asn	Ser	His	Asn	Ser	Asp	Asn	Val	Lys	Asp	Arg
				405					410					415	
Thr	Ile	Asn	Leu	Gly	Asn	Leu	Thr	Val	Glu	Gly	Asn	Leu	Ser	Leu	Ile
			420					425					430		
Gly	Glu	Asn	Ala	Asn	Ile	Asn	Gly	Asn	Leu	Ser	Ile	Glu	Lys	Glu	Ala
		435					440					445			
Ile	Phe	Lys	Gly	Lys	Thr	Lys	Asp	Ser	Leu	Asn	Ile	Thr	Gly	Asn	Phe
	450					455					460				
Thr	Asn	Asn	Gly	Thr	Ala	Glu	Ile	Asn	Ile	Ser	Gln	Gly	Val	Val	Ser
465					470					475					480
Leu	Gly	Asp	Ile	Thr	Asn	Asp	Gly	Lys	Leu	Asn	Ile	Thr	Thr	His	Ala
				485					490					495	

Lys Ser Gly Gln Lys Ser Ile Ile Arg Gly Asp Ile Ile Asn Lys Gln
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 Gly Asn Leu Asn Ile Thr Asp Asn Asn Ser Asn Ala Glu Ile Glu Ile
 515 520 525
 Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn Leu Thr Ile Ser Ser Asp
 530 535 540
 Lys Val Asn Ile Thr Lys Gln Ile Thr Ile Lys Ala Gly Val Asp Gly
 545 550 555 560
 Glu Ser Ser Ser Ser Ser Thr Ala Ser Asp Ala Asn Leu Thr Ile Lys
 565 570 575
 Thr Lys Glu Leu Thr Leu Thr Asp Asn Leu Asn Ile Ser Gly Phe Asn
 580 585 590
 Lys Ala Glu Ile Thr Ala Lys Asp Asn Ser Asp Leu Ile Ile Gly Lys
 595 600 605
 Ala Ser Ser Asp Asn Ser Asn Ala Lys Gln Val Thr Phe Asp Lys Val
 610 615 620
 Lys Asp Ser Lys Ile Ser Ala Gly Asn His Asn Val Thr Leu Asn Ser
 625 630 635 640
 Lys Val Glu Thr Ser Asn Ser Asp Gly Ser Thr Gly Asn Gly Ser Asp
 645 650 655
 Asp Asn Asn Ile Gly Leu Thr Ile Ser Ala Lys Asp Val Thr Val Asn
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 Ser Asn Ile Thr Ser His Lys Thr Val Asn Ile Ser Ala Ser Glu Gly
 675 680 685
 Gly Ile Thr Thr Lys Ala Gly Thr Thr Ile Asn Ala Thr Thr Gly Ser
 690 695 700
 Val Glu Val Thr Ala Lys Thr Gly Asp Ile Ser Gly Thr Ile Ser Gly
 705 710 715 720
 Lys Thr Val Ser Val Thr Ala Ser Thr Gly Asp Leu Thr Val Arg Lys
 725 730 735
 Ala Ala Thr Ile Ser Ala Thr Glu Gly Ala Ala Thr Leu Thr Ala Thr
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 Gly Asn Thr Leu Thr Thr Glu Ala Gly Ser Ser Ile Thr Ser Thr Lys
 755 760 765
 Gly Gln Val Asp Leu Ser Ala Gln Asp Gly Ser Ile Ala Gly Gln Ile
 770 775 780
 Ser Ala Ala Asn Val Thr Leu Asn Thr Thr Gly Thr Leu Thr Thr Val
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 Glu Gly Ser Asn Ile Lys Ala Thr Ser Gly Thr Leu Ala Ile Asn Ala

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Lys Asp Ala	Lys Leu Asp Gly Thr	Ala Ser Gly Asn Arg	Thr Glu Val		
	820	825	830		
Asn Ala Thr	Asn Ala Ser Gly Ser Gly Ser Val	Thr Ala Lys Thr Ser			
	835	840	845		
Ser Asn Val	Asn Ile Thr Gly Asp Leu Ser Thr	Ile Asn Gly Leu Asn			
	850	855	860		
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865	870	875	880		
Ile Asp Val Lys Tyr Ile Gln Pro Gly Val Ala Ser Val Glu Glu Val					
	885	890	895		
Ile Glu Ala Lys Arg Val Leu Glu Lys Val Lys Asp Leu Ser Asp Glu					
	900	905	910		
Glu Arg Glu Thr Leu Ala Lys Leu Gly Val Ser Ala Val Arg Phe Val					
	915	920	925		
Glu Pro Asn Asn Ala Ile Thr Ile Asn Thr Gln Asn Glu Phe Thr Thr					
	930	935	940		
Arg Pro Ser Ser Gln Val Ile Ile Ser Glu Gly Lys Ala Cys Phe Ser					
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Pro

<210> 54

<211> 3033

<212> DNA

<213> Haemophilus influenzae

<400> 54

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<210> 55

<211> 1010

<212> PRT

<213> Haemophilus influenzae

<400> 55

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15

Pro Gly Arg Asn Asp Gly Ser Val Asp Asp Phe Phe Pro Thr Gly Arg

20

25

30

Gly Asp Asp Ala Ser Asn Ala Lys Thr Asn His Pro Asp Lys Pro Thr

35

40

45

Leu Thr Asn Thr Thr Val Glu Asn Ala Leu Lys Asn Asn Thr Phe Val

50

55

60

Asn Ile Thr Ala Lys Asn Lys Ile Thr Val Asn Ser Asp Ile Asn Ile

65

70

75

80

Lys Gly Gly Ala His Leu Thr Leu Tyr Ser Lys Asn Asn Lys Lys Ser

85

90

95

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 Ala Gln Gly Val Ile Thr Ser Gly Val Gly Glu Gly Phe Arg Phe Asn
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 195 200 205
 Phe Asp Gly Asn Leu Asn Ile Ser Gly Lys Val Asn Val Ser Met Asp
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 225 230 235 240
 Asn Val Thr Thr Leu Asn Val Ala Ser Gly Ser Ser Phe Asn Leu Ser
 245 250 255
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 Arg Gly Leu Asn Gly Ile Thr Phe Asn Gly Glu Asn Thr Phe Asn Ile
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 Pro Lys Pro Asn Ser Asn Tyr Ala Leu Phe Asn Gly Asn Ile Ser Val
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 325 330 335
 His Thr Thr Ser Gly Ala Ile Ile Asn Ser Gln Asn Phe Asn Val Ser
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Ala	Lys	Phe	Asn	Gly	Ser	Thr	Lys	Asn	Asn	Leu	Asn	Ile	Thr	Gly	Thr
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Phe	Thr	Asn	Asn	Gly	Thr	Ser	Ile	Ile	Asp	Ile	Thr	Gln	Gly	Val	Val
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Val	Lys	Asp	Ser	Lys	Ile	Ser	Ala	Gly	Asn	His	Asn	Val	Thr	Leu	Asn
			660					665					670		
Ser	Lys	Val	Glu	Thr	Ser	Asn	Ser	Asp	Gly	Ser	Thr	Gly	Asn	Gly	Ser
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Asp	Asp	Asn	Asn	Ile	Gly	Leu	Thr	Ile	Ser	Ala	Lys	Asp	Val	Thr	Val
	690					695					700				
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<211> 3015

<212> DNA

<213> Haemophilus influenzae

<400> 56

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<210> 57

<211> 1004

<212> PRT

<213> Haemophilus influenzae

<400> 57

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Glu Asn Ala Leu Lys Asn Asn Thr Phe Val Asn Ile Thr Ala Lys Asn
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Lys Ile Thr Val Asn Ser Asp Ile Asn Ile Lys Gly Gly Ala His Leu
 65 70 75 80

Thr Leu Tyr Ser Lys Asn Asn Lys Lys Ser Ser Val Lys Ile Asn Gly
 85 90 95

Asn Ile Thr Ser Thr Thr Asn Gly Asn Leu Thr Ile Tyr Ser Ser Gly
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Trp Val Asp Ile His Lys Asn Ile Thr Leu Asn Thr Gly Tyr Leu Asn
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Ile Thr Ala Gly Gly Ser Val Ala Phe Glu Lys Ala Gly Asn Glu Lys
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Gly Arg Gln Val Ser Glu Ser Val Ile Lys Ala Gln Gly Val Ile Thr
 145 150 155 160

Ser Gly Val Gly Glu Gly Phe Arg Phe Asn Asn Val Ser Leu Asn Gly
 165 170 175

Val Gly Ala Gly Leu Arg Phe Val Gly Gln Lys Asn Ile Ser Ser Asn
 180 185 190

Ser Trp Arg Glu Asn Thr Ile Lys Asn Arg Phe Asp Gly Asn Leu Asn
 195 200 205

Ile Ser Gly Lys Val Asn Val Ser Met Asp Val Ser Gly Thr Lys Trp
 210 215 220

His Thr Arg Ile Asn Gly Arg Thr Tyr Trp Asn Val Thr Thr Leu Asn
 225 230 235 240

Val Ala Ser Gly Ser Ser Phe Asn Leu Ser Ile Asp Ala Ser Gly Ile
 245 250 255

Ser Ser Gly Asn Gln Asp Asp Ile Thr Asn Arg Gly Leu Asn Gly Ile
 260 265 270

Thr Phe Asn Gly Glu Asn Thr Phe Asn Ile Ala Gln Gly Ser Thr Ala
 275 280 285

Asn	Phe	His	Ile	Lys	Thr	Ser	Val	Met	Thr	Pro	Lys	Pro	Asn	Ser	Asn		
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				325					330					335			
Ile	Ile	Asn	Ser	Gln	Asn	Phe	Asn	Val	Ser	Gly	Gly	Ser	Lys	Leu	Asn		
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Leu	Lys	Ala	Ser	Gly	Ser	Thr	Asn	Thr	Ala	Phe	Leu	Ile	Lys	Asn	Asn		
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Leu	Thr	Leu	Asn	Ala	Thr	Gly	Gly	Asn	Ile	Glu	Ile	Lys	Gln	Val	Glu		
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Thr	Lys	Asn	Asn	Leu	Asn	Ile	Thr	Gly	Thr	Phe	Thr	Asn	Asn	Gly	Thr		
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Ser	Ile	Ile	Asp	Ile	Thr	Gln	Gly	Val	Val	Asn	Leu	Gly	Asn	Val	Thr		
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Ser	Ile	Ile	Arg	Gly	Asp	Ile	Ile	Asn	Lys	Gln	Gly	Asn	Leu	Asn	Ile		
	530					535					540						
Thr	Asp	Asn	Asn	Ser	Asn	Ala	Glu	Ile	Glu	Ile	Gly	Gly	Asn	Ile	Ser		
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Gln	Lys	Glu	Gly	Asn	Leu	Thr	Ile	Ser	Ser	Asp	Lys	Val	Asn	Ile	Thr		
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Lys	Gln	Ile	Thr	Ile	Lys	Ala	Gly	Val	Asp	Gly	Glu	Ser	Ser	Ser	Ser		
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Ser	Thr	Ala	Ser	Asp	Ala	Asn	Leu	Thr	Ile	Lys	Thr	Lys	Glu	Leu	Thr		
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 Ala Lys Asp Asn Ser Asp Leu Ile Ile Gly Lys Ala Ser Ser Asp Asn
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 660 665 670
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 675 680 685
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915 920 925

Val Leu Glu Lys Val Lys Asp Leu Ser Asp Glu Glu Arg Glu Thr Leu
930 935 940

Ala Lys Leu Gly Val Ser Ala Val Arg Phe Val Glu Pro Asn Asn Ala
945 950 955 960

Ile Thr Ile Asn Thr Gln Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln
 965 970 975

Val Ile Ile Ser Glu Gly Lys Ala Cys Phe Ser Ser Gly Asn Gly Ala
 980 985 990

Ala Val Cys Thr Asn Val Ala Asp Asp Gly Gln Pro
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<210> 58

<211> 2997

<212> DNA

<213> Haemophilus influenzae

<400> 58

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gctaaacaca  accaaagaag  catcatcggc  ggagatataa  tcaacaaaaa  aggaagctta  1620
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aatgtgacac  taaatagcaa  agtggaaaca  tctggtaata  ctgacaacac  tggagacggc  2040
agtggcaata  atgccggctt  aactattgcc  gcgaaaaatg  tagaagtaaa  aaacaacatt  2100

```

```

acttctaaca aaacagtaaa tatcaccgcg tcagaaaaaac ttaccaccaa agcggatgca 2160
accattaatg caaccactgg taacgtagaa gtgacagcca aaacaggtga tattaaggt 2220
gaagtcaa at ccacttcggt taatgtaaat attacagcaa acggcgacac gcttaatgta 2280
agtaatgttt caggcaatgc tgttaccatc actgcagata agggcaaatt aaccacccaa 2340
gcaagctcta gcattacctc aaacaatggc cagacaactc ttacagccaa ggatggcagt 2400
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aagttgaacg gcgcggcgc acgtgaccac acagtagtaa atgcaactaa cgcaagtggc 2580
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gtaaatggat taaatatcat ttcgaaaaat ggtagaaaca ccgtagtgtt aaaagggtact 2700
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cttgggtgta gtgctgtacg ttttattgaa ccaaataata ccattacggt taacacacaa 2880
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<210> 59

<211> 998

<212> PRT

<213> Haemophilus influenzae

<400> 59

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Lys Glu Trp Leu Leu Asp Pro Asp Asn Val Thr Ile Glu Ala Pro Ser
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```

```

Tyr Ser Arg Gly Asn Ala Gly Ile Asp Ser Glu Phe Pro Gly Gly Ser
          20                      25                      30

```

```

Gly Thr Lys Glu Ser Pro Lys Thr Asn Gly Glu Gln Pro Thr Val Leu
    35                      40                      45

```

```

Thr Asn Glu Thr Ile Ser Asn Tyr Leu Lys Ser Gly Thr Trp Val Met
    50                      55                      60

```

```

Asn Ile Thr Ala Lys Lys Asn Leu Thr Val Asn Ser Ser Ile Asn Ile
    65                      70                      75                      80

```

```

Gly Asp Ser Ser His Leu Ile Leu His Ser Glu Gly Lys Asn Asn Gly
          85                      90                      95

```

```

Gly Val Lys Ile Lys Glu Asp Ile Thr Ser Asn Gly Gly Asn Leu Thr
    100                      105                      110

```

```

Ile Gln Ser Gly Gly Trp Val Asp Val His Lys Asn Ile Thr Leu Gly
    115                      120                      125

```

```

Thr Gly Thr Leu Asn Ile Thr Ala Lys Gly Ser Ile Ala Phe Glu Gly
    130                      135                      140

```

```

Asn Gly Thr Glu Lys Ala Arg Asn Ala Ser Ser Ala Gln Ile Thr Ala
    145                      150                      155                      160

```

```

Gln Gly Thr Ile Thr Asn Thr Gly Asp Gln Lys Gln Leu Arg Leu Asn
    165                      170                      175

```

```

Asn Val Ser Ile Asn Gly Thr Gly Ile Gly Leu Asn Phe Val Ser Ile
    180                      185                      190

```

Gln Pro Asn Thr Ser His Arg Phe Asp Gly Glu Leu Ile Ile Ser Gly
 195 200 205
 Arg Val His Val Asn Gln Thr Thr Pro Lys Asn Leu Ser Phe Trp Lys
 210 215 220
 Val Ser Asp Glu Ser Tyr Trp Asn Val Ser His Leu Thr Val Lys Glu
 225 230 235 240
 Lys Ser Ala Phe Ser Phe Thr Lys Phe Ala Leu Asn Asn Asn His Gly
 245 250 255
 Arg Glu Thr Ser Arg Tyr Arg Lys Gly Gly Gly Val Ile Phe Arg Ser
 260 265 270
 Pro Thr Gly His Thr Asn Phe Thr Val Lys Gln Gly Ser Val Ala Asn
 275 280 285
 Phe Ser Phe Lys Ala Lys Asn Asp Thr Asn His Ala Asn Gln Leu Pro
 290 295 300
 Ile Gln Phe Asn Ser Asn Ile Ser Val Asp Gly Gly Gly Lys Val Leu
 305 310 315 320
 Phe Cys Ile Thr Ser Asn Tyr Ser Gly Arg Ser Val Gly Ile Gly Met
 325 330 335
 Ser Ser Ile Asn Val Ser Asp Gly Ser Asn Leu Thr Phe Asn Ser Ser
 340 345 350
 Ile Arg Gly Gln Glu Ala Phe Asn Ile Ser Lys Asp Leu Thr Ile Asn
 355 360 365
 Ala Thr Gly Ser Phe Phe Glu Leu Gly Gln Tyr Ser Asp Thr Phe Asn
 370 375 380
 Gly Asn Gly Phe Asn His Asp Ala Ile Lys Ser Thr His Asn Ile Ser
 385 390 395 400
 Ile Leu Gly Gly Asn Val Thr Leu Gly Gly Gln Asp Ser Ser Ser Thr
 405 410 415
 Ile Thr Gly Asn Ile Asn Ile Ser Gln Ala Ala Asn Val Thr Leu Arg
 420 425 430
 Ala Tyr Asn Gly Asn Gly Arg Asn Lys Gln Leu Thr Leu Gly Asn Val
 435 440 445
 Ser Ile Glu Gly Asn Leu Ser Leu Ile Gly Ala Ser Ala Asn Ile Asn
 450 455 460
 Gly Asn Leu Ser Val Lys Glu Asn Ala Lys Phe Lys Gly Glu Thr Gln
 465 470 475 480
 Asp Asn Leu Asn Ile Thr Gly Thr Phe Ile Asn Asn Gly Asp Ser Lys
 485 490 495
 Ile Asn Ile Ser Gln Gly Val Val Lys Leu Gly Asn Val Thr Asn Asp
 500 505 510

Gly Asp Leu Asn Ile Thr Thr His Ala Lys His Asn Gln Arg Ser Ile
 515 520 525
 Ile Gly Gly Asp Ile Ile Asn Lys Lys Gly Ser Leu Asn Ile Thr Asp
 530 535 540
 Ser Asn Lys Asn Ala Glu Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys
 545 550 555 560
 Glu Gly Asn Leu Thr Ile Ser Ser Asp Lys Ile Asn Ile Thr Asn Gln
 565 570 575
 Ile Thr Ile Lys Ala Gly Val Asp Gly Glu Asn Ser Asp Ser Asp Ala
 580 585 590
 Thr Asn Asn Ala Asn Leu Thr Ile Lys Thr Lys Glu Leu Lys Leu Thr
 595 600 605
 Gln Asp Leu Asn Ile Ser Gly Phe Asn Lys Ala Glu Ile Thr Ala Lys
 610 615 620
 Asp Gly Ser Asp Leu Thr Ile Gly Asn Thr Asn Ser Ala Asp Ser Thr
 625 630 635 640
 Asn Ala Lys Lys Val Thr Phe Asn Gln Val Lys Asp Ser Lys Ile Ser
 645 650 655
 Ala Gly Asp His Asn Val Thr Leu Asn Ser Lys Val Glu Thr Ser Gly
 660 665 670
 Asn Thr Asp Asn Thr Gly Asp Gly Ser Gly Asn Asn Ala Gly Leu Thr
 675 680 685
 Ile Ala Ala Lys Asn Val Glu Val Lys Asn Asn Ile Thr Ser Asn Lys
 690 695 700
 Thr Val Asn Ile Thr Ala Ser Glu Lys Leu Thr Thr Lys Ala Asp Ala
 705 710 715 720
 Thr Ile Asn Ala Thr Thr Gly Asn Val Glu Val Thr Ala Lys Thr Gly
 725 730 735
 Asp Ile Lys Gly Glu Val Lys Ser Thr Ser Gly Asn Val Asn Ile Thr
 740 745 750
 Ala Asn Gly Asp Thr Leu Asn Val Ser Asn Val Ser Gly Asn Ala Val
 755 760 765
 Thr Ile Thr Ala Asp Lys Gly Lys Leu Thr Thr Gln Ala Ser Ser Ser
 770 775 780
 Ile Thr Ser Asn Asn Gly Gln Thr Thr Leu Thr Ala Lys Asp Gly Ser
 785 790 795 800
 Ile Ala Gly Ser Ile Asn Ala Ala Asn Val Thr Leu Asn Thr Thr Gly
 805 810 815
 Thr Leu Thr Thr Val Glu Gly Ser Asn Ile Asn Ala Ala Ser Gly Thr

820	825	830
Leu Val Ile Asn Ala Lys Asp Ala Lys Leu Asn Gly Ala Ala Ser Gly		
835	840	845
Asp His Thr Val Val Asn Ala Thr Asn Ala Ser Gly Ser Gly Ser Val		
850	855	860
Thr Ala Val Thr Ser Ser Asn Val Asn Ile Thr Gly Asp Leu Ser Thr		
865	870	875
Val Asn Gly Leu Asn Ile Ile Ser Lys Asn Gly Arg Asn Thr Val Val		
885	890	895
Leu Lys Gly Thr Glu Ile Glu Val Lys Tyr Ile Gln Pro Gly Val Ala		
900	905	910
Ser Val Glu Glu Val Ile Glu Ala Lys Arg Val Leu Glu Lys Val Lys		
915	920	925
Asp Leu Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val Ser		
930	935	940
Ala Val Arg Phe Ile Glu Pro Asn Asn Thr Ile Thr Val Asn Thr Gln		
945	950	955
Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln Val Thr Ile Ser Glu Gly		
965	970	975
Lys Ala Cys Phe Ser Ser Gly Asn Gly Ala Ala Val Cys Thr Asn Val		
980	985	990
Ala Asp Asp Gly Gln Gln		
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<210> 60

<211> 2979

<212> DNA

<213> Haemophilus influenzae

<400> 60

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ttaaattttg tttcaattca gctaactact tctcacagat ttgatgggga gcttattatt 600
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tactccggca gatcagtggg gataggaatg tctagcatta atgtttctga tggctcaaac 1020

```

```

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<210> 61

<211> 992

<212> PRT

<213> Haemophilus influenzae

<400> 61

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Pro Asp Asn Val Thr Ile Glu Ala Pro Ser Tyr Ser Arg Gly Asn Ala
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```

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Gly Ile Asp Ser Glu Phe Pro Gly Gly Ser Gly Thr Lys Glu Ser Pro
      20                      25                      30

```

```

Lys Thr Asn Gly Glu Gln Pro Thr Val Leu Thr Asn Glu Thr Ile Ser
      35                      40                      45

```

```

Asn Tyr Leu Lys Ser Gly Thr Trp Val Met Asn Ile Thr Ala Lys Lys
      50                      55                      60

```

```

Asn Leu Thr Val Asn Ser Ser Ile Asn Ile Gly Asp Ser Ser His Leu
      65                      70                      75                      80

```

```

Ile Leu His Ser Glu Gly Lys Asn Asn Gly Gly Val Lys Ile Lys Glu
      85                      90                      95

```

Asp Ile Thr Ser Asn Gly Gly Asn Leu Thr Ile Gln Ser Gly Gly Trp
 100 105 110
 Val Asp Val His Lys Asn Ile Thr Leu Gly Thr Gly Thr Leu Asn Ile
 115 120 125
 Thr Ala Lys Gly Ser Ile Ala Phe Glu Gly Asn Gly Thr Glu Lys Ala
 130 135 140
 Arg Asn Ala Ser Ser Ala Gln Ile Thr Ala Gln Gly Thr Ile Thr Asn
 145 150 155 160
 Thr Gly Asp Gln Lys Gln Leu Arg Leu Asn Asn Val Ser Ile Asn Gly
 165 170 175
 Thr Gly Ile Gly Leu Asn Phe Val Ser Ile Gln Pro Asn Thr Ser His
 180 185 190
 Arg Phe Asp Gly Glu Leu Ile Ile Ser Gly Arg Val His Val Asn Gln
 195 200 205
 Thr Thr Pro Lys Asn Leu Ser Phe Trp Lys Val Ser Asp Glu Ser Tyr
 210 215 220
 Trp Asn Val Ser His Leu Thr Val Lys Glu Lys Ser Ala Phe Ser Phe
 225 230 235 240
 Thr Lys Phe Ala Leu Asn Asn Asn His Gly Arg Glu Thr Ser Arg Tyr
 245 250 255
 Arg Lys Gly Gly Gly Val Ile Phe Arg Ser Pro Thr Gly His Thr Asn
 260 265 270
 Phe Thr Val Lys Gln Gly Ser Val Ala Asn Phe Ser Phe Lys Ala Lys
 275 280 285
 Asn Asp Thr Asn His Ala Asn Gln Leu Pro Ile Gln Phe Asn Ser Asn
 290 295 300
 Ile Ser Val Asp Gly Gly Gly Lys Val Leu Phe Cys Ile Thr Ser Asn
 305 310 315 320
 Tyr Ser Gly Arg Ser Val Gly Ile Gly Met Ser Ser Ile Asn Val Ser
 325 330 335
 Asp Gly Ser Asn Leu Thr Phe Asn Ser Ser Ile Arg Gly Gln Glu Ala
 340 345 350
 Phe Asn Ile Ser Lys Asp Leu Thr Ile Asn Ala Thr Gly Ser Phe Phe
 355 360 365
 Glu Leu Gly Gln Tyr Ser Asp Thr Phe Asn Gly Asn Gly Phe Asn His
 370 375 380
 Asp Ala Ile Lys Ser Thr His Asn Ile Ser Ile Leu Gly Gly Asn Val
 385 390 395 400
 Thr Leu Gly Gly Gln Asp Ser Ser Ser Thr Ile Thr Gly Asn Ile Asn
 405 410 415

Ile Ser Gln Ala Ala Asn Val Thr Leu Arg Ala Tyr Asn Gly Asn Gly
 420 425 430
 Arg Asn Lys Gln Leu Thr Leu Gly Asn Val Ser Ile Glu Gly Asn Leu
 435 440 445
 Ser Leu Ile Gly Ala Ser Ala Asn Ile Asn Gly Asn Leu Ser Val Lys
 450 455 460
 Glu Asn Ala Lys Phe Lys Gly Glu Thr Gln Asp Asn Leu Asn Ile Thr
 465 470 475 480
 Gly Thr Phe Ile Asn Asn Gly Asp Ser Lys Ile Asn Ile Ser Gln Gly
 485 490 495
 Val Val Lys Leu Gly Asn Val Thr Asn Asp Gly Asp Leu Asn Ile Thr
 500 505 510
 Thr His Ala Lys His Asn Gln Arg Ser Ile Ile Gly Gly Asp Ile Ile
 515 520 525
 Asn Lys Lys Gly Ser Leu Asn Ile Thr Asp Ser Asn Lys Asn Ala Glu
 530 535 540
 Ile Gln Ile Gly Gly Asn Ile Ser Gln Lys Glu Gly Asn Leu Thr Ile
 545 550 555 560
 Ser Ser Asp Lys Ile Asn Ile Thr Asn Gln Ile Thr Ile Lys Ala Gly
 565 570 575
 Val Asp Gly Glu Asn Ser Asp Ser Asp Ala Thr Asn Asn Ala Asn Leu
 580 585 590
 Thr Ile Lys Thr Lys Glu Leu Lys Leu Thr Gln Asp Leu Asn Ile Ser
 595 600 605
 Gly Phe Asn Lys Ala Glu Ile Thr Ala Lys Asp Gly Ser Asp Leu Thr
 610 615 620
 Ile Gly Asn Thr Asn Ser Ala Asp Ser Thr Asn Ala Lys Lys Val Thr
 625 630 635 640
 Phe Asn Gln Val Lys Asp Ser Lys Ile Ser Ala Gly Asp His Asn Val
 645 650 655
 Thr Leu Asn Ser Lys Val Glu Thr Ser Gly Asn Thr Asp Asn Thr Gly
 660 665 670
 Asp Gly Ser Gly Asn Asn Ala Gly Leu Thr Ile Ala Ala Lys Asn Val
 675 680 685
 Glu Val Lys Asn Asn Ile Thr Ser Asn Lys Thr Val Asn Ile Thr Ala
 690 695 700
 Ser Glu Lys Leu Thr Thr Lys Ala Asp Ala Thr Ile Asn Ala Thr Thr
 705 710 715 720
 Gly Asn Val Glu Val Thr Ala Lys Thr Gly Asp Ile Lys Gly Glu Val

725					730					735					
Lys	Ser	Thr	Ser	Gly	Asn	Val	Asn	Ile	Thr	Ala	Asn	Gly	Asp	Thr	Leu
			740					745					750		
Asn	Val	Ser	Asn	Val	Ser	Gly	Asn	Ala	Val	Thr	Ile	Thr	Ala	Asp	Lys
		755					760					765			
Gly	Lys	Leu	Thr	Thr	Gln	Ala	Ser	Ser	Ser	Ile	Thr	Ser	Asn	Asn	Gly
	770					775					780				
Gln	Thr	Thr	Leu	Thr	Ala	Lys	Asp	Gly	Ser	Ile	Ala	Gly	Ser	Ile	Asn
785						790					795				800
Ala	Ala	Asn	Val	Thr	Leu	Asn	Thr	Thr	Gly	Thr	Leu	Thr	Thr	Val	Glu
				805					810					815	
Gly	Ser	Asn	Ile	Asn	Ala	Ala	Ser	Gly	Thr	Leu	Val	Ile	Asn	Ala	Lys
			820					825					830		
Asp	Ala	Lys	Leu	Asn	Gly	Ala	Ala	Ser	Gly	Asp	His	Thr	Val	Val	Asn
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Ala	Thr	Asn	Ala	Ser	Gly	Ser	Gly	Ser	Val	Thr	Ala	Val	Thr	Ser	Ser
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Asn	Val	Asn	Ile	Thr	Gly	Asp	Leu	Ser	Thr	Val	Asn	Gly	Leu	Asn	Ile
865						870					875				880
Ile	Ser	Lys	Asn	Gly	Arg	Asn	Thr	Val	Val	Leu	Lys	Gly	Thr	Glu	Ile
			885						890					895	
Glu	Val	Lys	Tyr	Ile	Gln	Pro	Gly	Val	Ala	Ser	Val	Glu	Glu	Val	Ile
			900					905					910		
Glu	Ala	Lys	Arg	Val	Leu	Glu	Lys	Val	Lys	Asp	Leu	Ser	Asp	Glu	Glu
		915					920					925			
Arg	Glu	Thr	Leu	Ala	Lys	Leu	Gly	Val	Ser	Ala	Val	Arg	Phe	Ile	Glu
	930					935					940				
Pro	Asn	Asn	Thr	Ile	Thr	Val	Asn	Thr	Gln	Asn	Glu	Phe	Thr	Thr	Arg
945						950					955				960
Pro	Ser	Ser	Gln	Val	Thr	Ile	Ser	Glu	Gly	Lys	Ala	Cys	Phe	Ser	Ser
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<210> 62

<211> 3568

<212> DNA

<213> Haemophilus influenzae

<400> 62

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3568

<210> 63

<211> 1188

<212> PRT

<213> Haemophilus influenzae

<400> 63

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Thr Thr Leu Thr Asn Ser Thr Leu Glu Lys Ile Leu Ala Arg Gly Ser
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Phe Val Asn Ile Thr Ala Asn Asn Glu Ile Arg Val Asn Ser Asp Ile
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Asn Ser Gly Val Leu Ile Asn Gly Asn Ile Thr Ser Thr Ala Asn Gly
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Gly Thr Gly Thr Gly Leu Leu Phe Asn Leu Ser Arg Pro Gln Lys Asn
180 185 190

Asn Ser Leu Val Thr Asn Tyr Phe Asn Gly Thr Leu Asn Ile Ser Gly
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Ser Val Asn Ile Ser Met Ile Pro Pro Asn Ala Thr Ser Asn Trp Tyr
210 215 220

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Ser Glu Asp Ser Asn Phe Asn Leu Thr Ile Asp Ser Ser Ala Glu Asp
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260 265 270

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 Lys Gln Ile Thr Ile Lys Lys Gly Val Asn Gly Glu Asn Ser Asp Ser

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<212> DNA

<213> Haemophilus influenzae

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<210> 65

<211> 1180

<212> PRT

<213> Haemophilus influenzae

<400> 65

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Pro Lys Arg Asn Asn Asn Thr Lys Thr Thr Leu Thr Asn Ser Thr Leu
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Glu Lys Ile Leu Ala Arg Gly Ser Phe Val Asn Ile Thr Ala Asn Asn
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Glu Ile Arg Val Asn Ser Asp Ile Asn Ile Gly Gly Asn Ser His Leu
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Thr Leu Trp Ser Ser Lys Asn Lys Asn Ser Gly Val Leu Ile Asn Gly
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Asn Ile Thr Ser Thr Ala Asn Gly Asn Leu Thr Ile Tyr Ser Ser Gly
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Trp Val Asp Ile His Lys Asn Ile Thr Leu Glu Ser Gly Arg Leu Asn
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Ile Thr Thr Lys Glu Gly Asp Val Ala Phe Glu Lys Gly Asn Asn Leu
  130             135             140

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Thr Ile Thr Gly Gln Gly Thr Ile Thr Ala Gly Asn Asn Lys Gly Phe
  145             150             155             160

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Arg Phe Glu Asn Val Ser Leu Asn Gly Thr Gly Thr Gly Leu Leu Phe
          165             170             175

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Asn Leu Ser Arg Pro Gln Lys Asn Asn Ser Leu Val Thr Asn Tyr Phe
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Asn Gly Thr Leu Asn Ile Ser Gly Ser Val Asn Ile Ser Met Ile Pro
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Pro Asn Ala Thr Ser Asn Trp Tyr Ser Arg Tyr Lys Gly Arg Thr Tyr
  210             215             220

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Trp Asn Ile Thr His Leu Asn Ala Ser Glu Asp Ser Asn Phe Asn Leu
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 260 265 270
 Asn Lys Asn Ala Lys Val Asn Phe Asn Ile Lys Ala Pro Ile Gly Thr
 275 280 285
 Ile Asn Gln Tyr Asn Asn Leu Asn Tyr Ala Leu Phe Asn Gly Asn Ile
 290 295 300
 Ser Val Ser Gly Gly Gly Asn Val Thr Phe Arg Leu Asn Ala Ser Ser
 305 310 315 320
 Ser Asn Gln Gln Thr Pro Gly Val Ile Ile Asn Ser Lys His Leu Asn
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 Ala Ser Lys Gly Ser Ser Leu Arg Phe Glu Thr Thr Gly Ser Thr Lys
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 Val Gly Phe Leu Ile Asn Asn Asp Leu Thr Leu Asn Ala Thr Gly Gly
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 Asn Ile Ser Leu Leu Gln Val Glu Gly Ile Asp Gly Met Ile Gly Glu
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 Thr Ala Gly Gly Asn Val Ile Asn Ile Gly Gly Asn Leu Thr Val Glu
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 Gly Leu Phe Asn Asn Lys Gly Asn Ser Asn Ile Ser Ile Ala Arg Gly
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 Gly Phe Asn Lys Ala Lys Ile Val Ala Lys Asp Ser Ser Asn Leu Thr
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 Ile Gly Asn Ser Asp Asp Ser Gly Asn Thr Ser Ala Lys Thr Val Thr
 625 630 635 640
 Phe Asn Asn Val Lys Asp Ser Lys Ile Ser Ala Asp Gly His Lys Val
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 Thr Leu Asn Ser Lys Val Lys Thr Leu Ser Asp Asn Asp Asn Asn Thr
 660 665 670
 Glu Gly Gly Ser Asp Asn Asn Thr Gly Leu Thr Ile Thr Ala Lys Asp
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 Val Glu Val Asn Asn Asn Ile Thr Ser His Lys Thr Val Asn Val Ser
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 Ala Ala Asn Gly Gly Ile Thr Thr Lys Thr Gly Thr Thr Ile Asn Ala
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 Thr Ala Gly Asn Val Glu Ile Thr Ala His Thr Gly Ser Ile Gln Gly
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 Gly Ile Glu Ser Lys Pro Gly Ser Val Thr Ile Val Ala Gly Gly Asp
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Ile Ser Gly Gly Lys Val Glu Val Ser Ala Thr Lys Asp Leu Ile Thr	885	890	895
Lys Ser Gly Ser Glu Ile Lys Ala Thr Ala Gly Glu Val Asn Val Thr	900	905	910
Ser Ala Thr Gly Thr Ile Asp Gly Thr Ile Ser Gly Asn Thr Val Asn	915	920	925
Val Thr Ala Asn Thr Gly Asp Leu Thr Val Glu Asp Ala Ala Lys Ile	930	935	940
Asp Ala Thr Gly Gly Ala Ala Thr Leu Thr Ala Thr Ser Gly Lys Leu	945	950	955
Thr Thr Lys Ala Ser Ser Ser Ile Thr Ser Ala Asn Asn Gln Val Asn	965	970	975
Leu Ser Ala Lys Asp Gly Ser Ile Gly Gly Asn Ile Asn Ala Ala Asn	980	985	990
Val Thr Leu Asn Thr Thr Gly Ala Leu Thr Thr Val Lys Gly Ser Ser	995	1000	1005
Ile Asn Ala Asn Ser Gly Thr Leu Val Ile Asn Ala Lys Asp Ala Glu	1010	1015	1020
Leu Asn Gly Glu Ala Ser Gly Asn His Thr Val Val Asn Ala Thr Asn	1025	1030	1035
Ala Asn Gly Ser Gly Ser Val Ile Ala Thr Thr Ser Ser Arg Val Asn	1045	1050	1055
Ile Thr Gly Asp Leu Ile Thr Ile Asn Gly Leu Asn Ile Ile Ser Lys	1060	1065	1070
Asn Gly Ile Asn Thr Val Leu Leu Lys Gly Val Lys Ile Asp Val Lys	1075	1080	1085
Tyr Ile Gln Pro Gly Ile Ala Ser Val Asp Glu Val Ile Glu Ala Lys	1090	1095	1100
Arg Ile Leu Glu Lys Val Lys Asp Leu Ser Asp Glu Glu Arg Glu Ala	1105	1110	1115
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<211> 1536

<212> PRT

<213> Haemophilus influenzae

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Pro Leu Ser Ala Met Leu Leu Ser Leu Gly Val Thr Ser Ile Pro Gln
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Ala Thr Met Gln Val Asp Gly Asn Lys Thr Ile Ile Arg Asn Ser Val
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 Gln Val Phe Leu Ile Asn Pro Asn Gly Ile Thr Ile Gly Lys Asp Ala
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 Ile Ser Asp Ile Ile Asn Pro Thr Ile Thr Tyr Ser Ile Ala Ala Pro
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 Glu Asn Glu Ala Val Asn Leu Gly Asp Ile Phe Ala Lys Gly Gly Asn
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 Ile Asn Val Arg Ala Ala Thr Ile Arg Asn Gln Gly Lys Leu Ser Ala
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 Asp Ser Val Ser Lys Asp Lys Ser Gly Asn Ile Val Leu Ser Ala Lys
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 Glu Gly Glu Ala Glu Ile Gly Gly Val Ile Ser Ala Gln Asn Gln Gln
 305 310 315 320
 Ala Lys Gly Gly Lys Leu Met Ile Thr Gly Asp Lys Val Thr Leu Lys
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 Thr Gly Ala Val Ile Asp Leu Ser Gly Lys Glu Gly Gly Glu Thr Tyr
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 Leu Gly Gly Asp Glu Arg Gly Glu Gly Lys Lys Gly Ile Gln Leu Ala
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 Lys Lys Thr Ser Leu Glu Lys Gly Ser Thr Ile Asn Val Ser Gly Lys
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 Glu Lys Gly Gly Arg Ala Ile Val Trp Gly Asp Ile Ala Leu Ile Asp
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 Gly Asn Ile Asn Ala Gln Gly Ser Gly Asp Ile Ala Lys Thr Gly Gly

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<212> PRT

<213> Haemophilus influenzae

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Tyr Val Asn Ser Ser Ile Asn Leu Ser Asn Gly Ser Leu Thr Leu Trp
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Ser Val Leu Ala Ser Gly Leu Gln Gly Met Asp Val Val His Gly Thr	65	70	75
Ala Thr Met Gln Val Asp Gly Asn Lys Thr Ile Ile Arg Asn Ser Val	85	90	95
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Val Gln Phe Leu Gln Glu Asn Asn Asn Ser Ala Val Phe Asn Arg Val	115	120	125
Thr Ser Asn Gln Ile Ser Gln Leu Lys Gly Ile Leu Asp Ser Asn Gly	130	135	140
Gln Val Phe Leu Ile Asn Pro Asn Gly Ile Thr Ile Gly Lys Asp Ala	145	150	155
Ile Ile Asn Thr Asn Gly Phe Thr Ala Ser Thr Leu Asp Ile Ser Asn	165	170	175
Glu Asn Ile Lys Ala Arg Asn Phe Thr Phe Glu Gln Thr Lys Asp Lys	180	185	190
Ala Leu Ala Glu Ile Val Asn His Gly Leu Ile Thr Val Gly Lys Asp	195	200	205
Gly Ser Val Asn Leu Ile Gly Gly Lys Val Lys Asn Glu Gly Val Ile	210	215	220
Ser Val Asn Gly Gly Ser Ile Ser Leu Leu Ala Gly Gln Lys Ile Thr	225	230	235
Ile Ser Asp Ile Ile Asn Pro Thr Ile Thr Tyr Ser Ile Ala Ala Pro	245	250	255
Glu Asn Glu Ala Val Asn Leu Gly Asp Ile Phe Ala Lys Gly Gly Asn	260	265	270
Ile Asn Val Arg Ala Ala Thr Ile Arg Asn Gln Gly Lys Leu Ser Ala	275	280	285
Asp Ser Val Ser Lys Asp Lys Ser Gly Asn Ile Val Leu Ser Ala Lys	290	295	300
Glu Gly Glu Ala Glu Ile Gly Gly Val Ile Ser Ala Gln Asn Gln Gln	305	310	315
			320

Ala Lys Gly Gly Lys Leu Met Ile Thr Gly Asp Lys Val Thr Leu Lys
 325 330 335
 Thr Gly Ala Val Ile Asp Leu Ser Gly Lys Glu Gly Gly Glu Thr Tyr
 340 345 350
 Leu Gly Gly Asp Glu Arg Gly Glu Gly Lys Asn Gly Ile Gln Leu Ala
 355 360 365
 Lys Lys Thr Ser Leu Glu Lys Gly Ser Thr Ile Asn Val Ser Gly Lys
 370 375 380
 Glu Lys Gly Gly Arg Ala Ile Val Trp Gly Asp Ile Ala Leu Ile Asp
 385 390 395 400
 Gly Asn Ile Asn Ala Gln Gly Ser Gly Asp Ile Ala Lys Thr Gly Gly
 405 410 415
 Phe Val Glu Thr Ser Gly His Tyr Leu Ser Ile Asp Ser Asn Ala Ile
 420 425 430
 Val Lys Thr Lys Glu Trp Leu Leu Asp Pro Asp Asp Val Thr Ile Glu
 435 440 445
 Ala Glu Asp Pro Leu Arg Asn Asn Thr Gly Ile Asn Asp Glu Phe Pro
 450 455 460
 Thr Gly Thr Gly Glu Ala Ser Asp Pro Lys Lys Asn Ser Glu Leu Lys
 465 470 475 480
 Thr Thr Leu Thr Asn Thr Thr Ile Ser Asn Tyr Leu Lys Asn Ala Trp
 485 490 495
 Thr Met Asn Ile Thr Ala Ser Arg Lys Leu Thr Val Asn Ser Ser Ile
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 Asn Ile Gly Ser Asn Ser His Leu Ile Leu His Ser Lys Gly Gln Arg
 515 520 525
 Gly Gly Gly Val Gln Ile Asp Gly Asp Ile Thr Ser Lys Gly Gly Asn
 530 535 540
 Leu Thr Ile Tyr Ser Gly Gly Trp Val Asp Val His Lys Asn Ile Thr
 545 550 555 560
 Leu Asp Gln Gly Phe Leu Asn Ile Thr Ala Ala Ser Val Ala Phe Glu
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 Gly Gly Asn Asn Lys Ala Arg Asp Ala Ala Asn Ala Lys Ile Val Ala
 580 585 590
 Gln Gly Thr Val Thr Ile Thr Gly Glu Gly Lys Asp Phe Arg Ala Asn
 595 600 605
 Asn Val Ser Leu Asn Gly Thr Gly Lys Gly Leu Asn Ile Ile Ser Ser
 610 615 620
 Val Asn Asn Leu Thr His Asn Leu Ser Gly Thr Ile Asn Ile Ser Gly
 625 630 635 640

Asn Ile Thr Ile Asn Gln Thr Thr Arg Lys Asn Thr Ser Tyr Trp Gln
 645 650 655
 Thr Ser His Asp Ser His Trp Asn Val Ser Ala Leu Asn Leu Glu Thr
 660 665 670
 Gly Ala Asn Phe Thr Phe Ile Lys Tyr Ile Ser Ser Asn Ser Lys Gly
 675 680 685
 Leu Thr Thr Gln Tyr Arg Ser Ser Ala Gly Val Asn Phe Asn Gly Val
 690 695 700
 Asn Gly Asn Met Ser Phe Asn Leu Lys Glu Gly Ala Lys Val Asn Phe
 705 710 715 720
 Lys Leu Lys Pro Asn Glu Asn Met Asn Thr Ser Lys Pro Leu Pro Ile
 725 730 735
 Arg Phe Leu Ala Asn Ile Thr Ala Thr Gly Gly Gly Ser Val Phe Phe
 740 745 750
 Asp Ile Tyr Ala Asn His Ser Gly Arg Gly Ala Glu Leu Lys Met Ser
 755 760 765
 Glu Ile Asn Ile Ser Asn Gly Ala Asn Phe Thr Leu Asn Ser His Val
 770 775 780
 Arg Gly Asp Asp Ala Phe Lys Ile Asn Lys Asp Leu Thr Ile Asn Ala
 785 790 795 800
 Thr Asn Ser Asn Phe Ser Leu Arg Gln Thr Lys Asp Asp Phe Tyr Asp
 805 810 815
 Gly Tyr Ala Arg Asn Ala Ile Asn Ser Thr Tyr Asn Ile Ser Ile Leu
 820 825 830
 Gly Gly Asn Val Thr Leu Gly Gly Gln Asn Ser Ser Ser Ser Ile Thr
 835 840 845
 Gly Asn Ile Thr Ile Glu Lys Ala Ala Asn Val Thr Leu Glu Ala Asn
 850 855 860
 Asn Ala Pro Asn Gln Gln Asn Ile Arg Asp Arg Val Ile Lys Leu Gly
 865 870 875 880
 Ser Leu Leu Val Asn Gly Ser Leu Ser Leu Thr Gly Glu Asn Ala Asp
 885 890 895
 Ile Lys Gly Asn Leu Thr Ile Ser Glu Ser Ala Thr Phe Lys Gly Lys
 900 905 910
 Thr Arg Asp Thr Leu Asn Ile Thr Gly Asn Phe Thr Asn Asn Gly Thr
 915 920 925
 Ala Glu Ile Asn Ile Thr Gln Gly Val Val Lys Leu Gly Asn Val Thr
 930 935 940
 Asn Asp Gly Asp Leu Asn Ile Thr Thr His Ala Lys Arg Asn Gln Arg

945	950	955	960
Ser Ile Ile Gly Gly Asp Ile Ile Asn Lys Lys Gly Ser Leu Asn Ile	965	970	975
Thr Asp Ser Asn Asn Asp Ala Glu Ile Gln Ile Gly Gly Asn Ile Ser	980	985	990
Gln Lys Glu Gly Asn Leu Thr Ile Ser Ser Asp Lys Ile Asn Ile Thr	995	1000	1005
Lys Gln Ile Thr Ile Lys Lys Gly Ile Asp Gly Glu Asp Ser Ser Ser	1010	1015	1020
Asp Ala Thr Ser Asn Ala Asn Leu Thr Ile Lys Thr Lys Glu Leu Lys	1025	1030	1035
Leu Thr Glu Asp Leu Ser Ile Ser Gly Phe Asn Lys Ala Glu Ile Thr	1045	1050	1055
Ala Lys Asp Gly Arg Asp Leu Thr Ile Gly Asn Ser Asn Asp Gly Asn	1060	1065	1070
Ser Gly Ala Glu Ala Lys Thr Val Thr Phe Asn Asn Val Lys Asp Ser	1075	1080	1085
Lys Ile Ser Ala Asp Gly His Asn Val Thr Leu Asn Ser Lys Val Lys	1090	1095	1100
Thr Ser Ser Ser Asn Gly Gly Arg Glu Ser Asn Ser Asp Asn Asp Thr	1105	1110	1115
Gly Leu Thr Ile Thr Ala Lys Asn Val Glu Val Asn Lys Asp Ile Thr	1125	1130	1135
Ser Leu Lys Thr Val Asn Ile Thr Ala Ser Glu Lys Val Thr Thr Thr	1140	1145	1150
Ala Gly Ser Thr Ile Asn Ala Thr Asn Gly Lys Ala Ser Ile Thr Thr	1155	1160	1165
Lys Thr Gly Asp Ile Ser Gly Thr Ile Ser Gly Asn Thr Val Ser Val	1170	1175	1180
Ser Ala Thr Gly Asp Leu Thr Thr Lys Ser Gly Ser Lys Ile Glu Ala	1185	1190	1195
Lys Ser Gly Glu Ala Asn Val Thr Ser Ala Thr Gly Thr Ile Gly Gly	1205	1210	1215
Thr Ile Ser Gly Asn Thr Val Asn Val Thr Ala Asn Ala Gly Asp Leu	1220	1225	1230
Thr Val Gly Asn Gly Ala Glu Ile Asn Ala Thr Glu Gly Ala Ala Thr	1235	1240	1245
Leu Thr Ala Thr Gly Asn Thr Leu Thr Thr Glu Ala Gly Ser Ser Ile	1250	1255	1260

Thr Ser Thr Lys Gly Gln Val Asp Leu Leu Ala Gln Asn Gly Ser Ile
1265 1270 1275 1280

Ala Gly Ser Ile Asn Ala Ala Asn Val Thr Leu Asn Thr Thr Gly Thr
1285 1290 1295

Leu Thr Thr Val Ala Gly Ser Asp Ile Lys Ala Thr Ser Gly Thr Leu
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Val Ile Asn Ala Lys Asp Ala Lys Leu Asn Gly Asp Ala Ser Gly Asp
1315 1320 1325

Ser Thr Glu Val Asn Ala Val Asn Ala Ser Gly Ser Gly Ser Val Thr
1330 1335 1340

Ala Ala Thr Ser Ser Ser Val Asn Ile Thr Gly Asp Leu Asn Thr Val
1345 1350 1355 1360

Asn Gly Leu Asn Ile Ile Ser Lys Asp Gly Arg Asn Thr Val Arg Leu
1365 1370 1375

Arg Gly Lys Glu Ile Glu Val Lys Tyr Ile Gln Pro Gly Val Ala Ser
1380 1385 1390

Val Glu Glu Val Ile Glu Ala Lys Arg Val Leu Glu Lys Val Lys Asp
1395 1400 1405

Leu Ser Asp Glu Glu Arg Glu Thr Leu Ala Lys Leu Gly Val Ser Ala
1410 1415 1420

Val Arg Phe Val Glu Pro Asn Asn Thr Ile Thr Val Asn Thr Gln Asn
1425 1430 1435 1440

Glu Phe Thr Thr Arg Pro Ser Ser Gln Val Ile Ile Ser Glu Gly Lys
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<211> 3108

<212> DNA

<213> Haemophilus influenzae

<400> 72

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<211> 1036

<212> PRT

<213> Haemophilus influenzae

<400> 73

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35 40 45

Asn Tyr Leu Lys Asn Ala Trp Thr Met Asn Ile Thr Ala Ser Arg Lys
 50 55 60
 Leu Thr Val Asn Ser Ser Ile Asn Ile Gly Ser Asn Ser His Leu Ile
 65 70 75 80
 Leu His Ser Lys Gly Gln Arg Gly Gly Gly Val Gln Ile Asp Gly Asp
 85 90 95
 Ile Thr Ser Lys Gly Gly Asn Leu Thr Ile Tyr Ser Gly Gly Trp Val
 100 105 110
 Asp Val His Lys Asn Ile Thr Leu Asp Gln Gly Phe Leu Asn Ile Thr
 115 120 125
 Ala Ala Ser Val Ala Phe Glu Gly Gly Asn Asn Lys Ala Arg Asp Ala
 130 135 140
 Ala Asn Ala Lys Ile Val Ala Gln Gly Thr Val Thr Ile Thr Gly Glu
 145 150 155 160
 Gly Lys Asp Phe Arg Ala Asn Asn Val Ser Leu Asn Gly Thr Gly Lys
 165 170 175
 Gly Leu Asn Ile Ile Ser Ser Val Asn Asn Leu Thr His Asn Leu Ser
 180 185 190
 Gly Thr Ile Asn Ile Ser Gly Asn Ile Thr Ile Asn Gln Thr Thr Arg
 195 200 205
 Lys Asn Thr Ser Tyr Trp Gln Thr Ser His Asp Ser His Trp Asn Val
 210 215 220
 Ser Ala Leu Asn Leu Glu Thr Gly Ala Asn Phe Thr Phe Ile Lys Tyr
 225 230 235 240
 Ile Ser Ser Asn Ser Lys Gly Leu Thr Thr Gln Tyr Arg Ser Ser Ala
 245 250 255
 Gly Val Asn Phe Asn Gly Val Asn Gly Asn Met Ser Phe Asn Leu Lys
 260 265 270
 Glu Gly Ala Lys Val Asn Phe Lys Leu Lys Pro Asn Glu Asn Met Asn
 275 280 285
 Thr Ser Lys Pro Leu Pro Ile Arg Phe Leu Ala Asn Ile Thr Ala Thr
 290 295 300
 Gly Gly Gly Ser Val Phe Phe Asp Ile Tyr Ala Asn His Ser Gly Arg
 305 310 315 320
 Gly Ala Glu Leu Lys Met Ser Glu Ile Asn Ile Ser Asn Gly Ala Asn
 325 330 335
 Phe Thr Leu Asn Ser His Val Arg Gly Asp Asp Ala Phe Lys Ile Asn
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 Lys Asp Leu Thr Ile Asn Ala Thr Asn Ser Asn Phe Ser Leu Arg Gln
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Thr Lys Asp Asp Phe Tyr Asp Gly Tyr Ala Arg Asn Ala Ile Asn Ser
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 Thr Tyr Asn Ile Ser Ile Leu Gly Gly Asn Val Thr Leu Gly Gly Gln
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 Ser Asp Lys Ile Asn Ile Thr Lys Gln Ile Thr Ile Lys Lys Gly Ile
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 Gly Asn Ser Asn Asp Gly Asn Ser Gly Ala Glu Ala Lys Thr Val Thr
 625 630 635 640
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 645 650 655
 Thr Leu Asn Ser Lys Val Lys Thr Ser Ser Ser Asn Gly Gly Arg Glu
 660 665 670
 Ser Asn Ser Asp Asn Asp Thr Gly Leu Thr Ile Thr Ala Lys Asn Val



Ile Thr Val Asn Thr Gln Asn Glu Phe Thr Thr Arg Pro Ser Ser Gln
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<210> 75
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<210> 76
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<400> 77
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<210> 78
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<212> DNA

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<210> 86
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<211> 41
<212> DNA
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<211> 39
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<210> 90
<211> 39
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50

<210> 93
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<400> 93
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<210> 94
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43

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 <211> 49
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49